This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

+ *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.

+ *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.

+ *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.

+ *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at `http://books.google.com/`

ER
980

GODFREY LOWELL CABOT
SCIENCE LIBRARY

HARVARD COLLEGE LIBRARY

Dr. Bennett F. Davenport,
751 TREMONT ST.
BOSTON, - - MASS.

JOURNAL

OF

The Philadelphia College of Pharmacy.

EDITED BY

BENJAMIN ELLIS, M.D.

Professor of Materia Medica and Pharmacy in the College, &c.

ASSISTED BY

A Publishing Committee

CONSISTING OF

DANIEL B. SMITH, CHARLES ELLIS, S. P. GRIFFITTS, Jr,

AND

GEORGE B. WOOD, M.D.

Professor of Chemistry in the College, &c.

VOL. II.

Philadelphia:
PUBLISHED BY J. GRIGG, No. 9, N. FOURTH STREET.
James Kay, Jun. & Co. Printers, No. 4, Minor Street.
1831.

HARVARD COLLEGE LIBRARY
FROM THE LIBRARY OF
GODFREY M. HYAMS
NOVEMBER 9, 1928

TRANSFERRED TO
CHEMICAL LABORATORY

Philadelphia:
Printed by James Kay, Jun. & Co.
Printers to the Philadelphia Medical Society,
No. 4, Minor Street.

TO SUBSCRIBERS.

We offer an apology to our friends and subscribers for the late appearance of this number of our Journal. It is not the result of idleness, nor a deficiency of materials, but as a mere matter of convenience in our arrangements with the printer. We shall publish the third volume quarterly, as heretofore, on the first of the month.

We cannot omit the opportunity to state that many of our distant subscribers are still in arrears, and as they will possess, on the receipt of this number, two complete volumes of the work, we earnestly request that they will remit the amount due as speedily as possible.

To each individual so small a sum can be of very little consequence, and we believe the delay generally results more from forgetfulness than unwillingness to pay. But to the successful prosecution of a periodical journal, money is a *sine qua non;* and as our terms are in advance, and have been fairly stated from the commencement, we shall positively erase from our list the names of all those who do not make us remittances before the publication of the first number of our third volume.

We shall be obliged to our correspondents to address their letters (post paid) either to the editor, or the treasurer, Samuel P. Griffitts, Jun., S. W. corner of Eighth and Chesnut Streets.

Philadelphia, Jan. 1831.

PHARMACOPŒIA OF THE UNITED STATES.

We are informed that the Pharmacopœia of the United States, revised under the authority of the National Medical Convention, held at Washington in January last, is now in press in this city, and will shortly be published.

CONTENTS.

No. I.

Original Communications.

Remarks on the Common Hydrometer, with a description of a new method of graduating that Instrument. By Daniel B. Smith. - - - - - - - 9
Pinus Canadensis, Willd. Abies Canadensis, Mich. Sylv. By Charles Ellis. - - - - - - 18
On the Ipomœa Jalapa. By Daniel B. Smith. - - 22
Observations on Seneca Oil. By Samuel Allinson, Jun. 35

Selected Articles.

Observations on Sarsaparilla and its preparations, with incidental remarks on certain other remedial agents in the cure of obstinate chronical disorders. By John Hancock, M.D. - - - - - - - 37
Memoir upon Fecula. By M. Guibourt. - - - 46
Observations on the Orayuri or Angustura Bark Tree. By John Hancock, M.D. - - - - - - 50
On some Pharmaceutical Preparations of Iron, and particularly the Tartrates. By Andrew Ure, M.D. 61
Formulæ for different Compounds prepared with Sarsaparilla. By M. Beral. - - - - - - - 64
New Salifiable Organic Base. - - - - - - 69
New Process for the Preparation of Morphia, &c. By M. J. B. Fauré. - - - - - - - - 71
On the Mutual Action of Sulphuric Acid and Alcohol, and on the Nature of the Process by which Ether is formed. By Henry Hennel. - - - - - 73

Miscellany.

Citric Acid from Gooseberries.—Pinic Acid a constituent of Venice Turpentine.—Silvic Acid.—Chemical

Constitution of Acetic Ether.—Nut-galls an Antidote to Strychnia.—Chlorine, Iodine and Bromine, Antidotes to the Vegetable Alkalies.—Test of Myrrh.—Copaiba.—Active Medicinal principle in the Root of Chiococca Racemosa.—Alkaline Principles in the Willow Bark.—Ergot of Maize.—Method of preparing Narcotic Extracts. . - - - - - 81

No. II.

Original Communications.

Bromine and its Chemical Combinations. By C. Lowig. 89

On Polygala Senega. The Seneka Snake Root. By Daniel B. Smith. - - - - - - - 105

On Weights and Measures. By Benjamin Ellis, M.D. 111

Selected Articles.

On the Blue Colouring-matter of Lapis Lazuli, and on Artificial Ultramarine. By Dr Fr. W. Schweigger-Seidel. - - - - - - - - - - 136

Observations and Experiments upon the Kusia or Koosia of the Indians,—the Bitter Cucumber, Momordica Operculata of Linnæus. By John Hancock, M.D. 144

Review.

Traité des Moyens de reconnaitre les Falsifications des Drogues Simples et Composées, et d'en constater le Degré de Pureté. Par A. Bussy et A. F. Boutron-Charlard. - - - - - - - - - - 154

Minutes of the College. - - - - - - 159

Miscellany.

Non-existence of Chinioidine.—Animal Charcoal as a Remedy in Glandular Affections.—Copaiva.—On Styrax or Storax of Bogota. By M. Bonastre.—The Radical Metal of Magnesia.—Kermes Mineral.—Vesicating Insects.—Formulæ and Processes for several Plaister Cloths. By M. Beral, Pharmacien.—Formula for a Syrup of Gum Tragacanth.—Crystalline Matter extracted from Bitter Almonds.—Solidification of Turpentine by Magnesia. - - 161

No. III.

Original Communications.

Bromine and its Chemical Combinations. By C. Lowig. 169
On Weights and Measures. By Benjamin Ellis, M.D. 188
On Moxas and their Preparations. By Elias Durand. 206
On Sabbatia Angularis. By Daniel B. Smith. - - 213
Notice of Iron found in the Powder of Cinchona Bark. By Charles Ellis. - - - - - - - 216
On Aromatic or Spiced Syrup of Rhubarb. By Elias Durand. - - - - - - - - - 218

Selected Articles.

On the Fermentation of Opium applied to the Extraction of Morphia. By A. Blondeau, Pharmacien. - 219
On Kinic Acid and its Principal Combinations with Salifiable Bases. - - - - - - - - 227
Botanical Notice of the different Genera and Species whose barks have been confounded under the name of Cinchona. By Prof. Decandolle. - - - 234

Review.

Traité des Moyens de reconnaitre les Falsifications des Drogues, Simples et Composées, et d'en constater le Degré de Pureté. Par A. Bussy et A. F. Boutron-Charlard. - - - - - - - - - 242

Miscellany.

Salicine or active principle of Willow Bark.—Sarsaparilla.—Notice of Piperin.—Formula.—Dœberiner's Glass of Strontia.—Scheele's Green.—Method of drying Narcotic Plants for powders.—La Societé de Pharmacie de Paris.—New Source of Spirit.—Estimation of the Vegeto-Alkali in Peruvian Bark.—Taste of Sulphate of Quinia.—Phosphate of Quinia.—Development and Growth of Cantharides.—Effect of Light on Plants. - - - - - - 248

No. IV.

Original Communications.

Address delivered to the Graduates of the College. By Henry Troth, Esq. one of the Vice Presidents. 257

Observations on some Indigenous Species of the genus Cantharis of Latreille, as fit substitutes for the Blising Fly of the shops. By Elias Durand. - - 271

On the Compound Syrup, and Fluid Extract, of Sarsaparilla. By William Hodgson, Jun. - - - 282

On Baumé's Hydrometer. By Daniel B. Smith. - 286

Selected Articles.

Botanical Notice of the different Genera and Species whose barks have been confounded under the name of Cinchona. By Prof. Decandolle. - - - 290

State of Pharmacy in Paris. - - - - - 296

Memoir of the Iodates and Chlorates of the Vegetable Alkalies. By M. Serullas. - - - - - 301

On the Preparation of the Schweinfurt Green. By Creuzburg, Chemist, at Octingen. - - - 308

Minutes of the College. - - - - - - 312

Review.

The Pharmacopœia of the United States of America, by the authority of "the General Convention for the formation of the American Pharmacopœia," held in 1830. Second Edition: from the First Edition, published in 1820, with Additions and Corrections. 315

Miscellany.

On Salicine.—Preparation of Salicine.—Ioduretted Hydriodic Acid an agent to distinguish Rhubarb.—Analysis of the Leaves of Uva Ursi.—Examination of the Milky Juice of the Fig.—Analysis of the Cocoa Nut.—Analysis of Balsam of Mecca.—Analysis of Copaiba.—Purity of Balsam Copaiba.—Centaurine.—Powdering Phosphorus.—Analysis of Mustard Seed.—Odoriferous Troches for Fumigation.—Electuaries, Confections, &c.—Almond Paste for the Hands.—Dentifrice of Coral and Quinia.—Resinosaponaceous Mixtures.—Observations on the Vegetable Milk furnished by the Palo-de-vaca.—Drusium, Resin of Oak. - - - - - - - 337

JOURNAL

OF

The Philadelphia College of Pharmacy.

NEW SERIES.

VOL. II.—APRIL 1830.—NO. I.

Original Communications.

Remarks on the Common Hydrometer, with a description of a new method of graduating that instrument. By Daniel B. Smith. Read October 1825.

There have been several modifications of the Pese-liqueurs of Baumè, all of which are liable to the same objections. The arèomètre of Cartier is so nearly similar to that of Baumè, that it is difficult to imagine a reason for adopting it in preference to that, unless indeed the accidental circumstance of its more careful graduation has secured it the superiority. Cartier plunges his arèomètre into a liquid marking exactly 22 of Baumè, and marks 22 on his scale at this point. He then takes on the scale a space equal to 16 of Baumè, which he divides into 15 parts or degrees. Thus the degrees of Cartier are 1-15th greater than those of Baumè, and the twenty-second degree of their scales correspond with each other. To reduce Cartier's scale to Baumè's add 1-15th of the difference between the given degree and 22, when the number exceeds 22; and subtract it when less.

The hydrometer of the Amsterdam Pharmacopœia of 1792, commences the scale at distilled water, and makes 40 correspond with 45 of Baumè; so that 6° of this scale equal 7° of Baumè. Another modification of Baumè's hydrometer, proposed by Niemann in the Pharmacopœia Batava, consists merely in making the point to which the instrument sinks in water, zero, instead of 10°, while the length of a degree continues the same.

The centigrade alcoholmeter of Gay-Lussac is by far the most convenient that has yet been devised for ascertaining the strength of spirituous liquors. The degrees of the scale indicate the per centage of absolute alcohol contained in the mixture. These degrees of course are of unequal lengths, and the instrument must be used at the temperature for which it was graduated; we shall otherwise be obliged to calculate the true proportion from the ordinary tables, of the expansion of spirits by heat. The instrument of Gay-Lussac, elegant and useful as it is, is therefore of limited utility, and not superior in practical value to the one which is now proposed. It may be remarked in passing, that the length of the degrees in the centigrade hydrometer may readily be calculated by the formula given below, aided by the tables of Gilpin.

The most exact method of ascertaining the specific gravities of fluids is, undoubtedly, to weigh equal bulks of them carefully. This mode, however, is troublesome, and not always practicable. Advantage has therefore been taken of the law of hydrostatics, that a floating body will displace a quantity, which is inversely as the weight of the fluid in which it swims. The hydrometer is constructed upon this principle—being a bulb with a long stem, so loaded that the two extremes of the stem will mark the lightest and heaviest fluids in which the instrument is to be tried. When proper care is taken in its construction the results which it gives are perfectly correct, although not capable of being observed with as much exactness as those of a good balance. The hydrometer in common use (that of Baumè) is of two kinds, one for spirits and the other for saline and acid solutions. The former is graduated by making the point to which it sinks in distilled water, ten degrees of the scale, and that to which it sinks in a solution of one part, by weight, of dry muriate of soda in nine parts of water, zero; the instrument being so loaded that zero is at the lower end of the stem. In the latter the instrument is loaded so as to sink to the top of the stem in distilled water, which point is made zero; while the point to which it sinks in a solution of fifteen parts, by weight, of dry muriate of soda in eighty-five parts of distilled water, is marked fifteen degrees. The instruments are graduated by marking off equal divisions of these degrees respectively upon the stems. It is an objection to this mode of graduation, that by taking as starting points so small a part of the scale, the error of observation, if any, is multiplied in the higher numbers. Another objection, which applies equally to all the hydrometers in common use is, that the scales are altogether arbitrary, and that they are not intelligible to the general student.

To avoid the inconveniences above mentioned, it is proposed to construct an instrument, of which one hundred degrees shall represent an increase or decrease of two-tenths of specific gravity, water being zero, and the scale equally divided. As the depth to which it will sink, or the quantity of fluid which it will displace is in the inverse ratio of the specific gravity of the fluid, it is easy to ascertain the precise value of each degree of the scale in terms of specific gravity. Taking the specific gravity of water as 1, and that indicated by one hundred degrees of the instrument at .8, let it be required to find the specific gravity (S) indicated by any other degree (n) of the scale. Put $x =$ the bulk of water displaced by the instrument, $y =$ the bulk of each degree of the stem, and $x + 100y =$ the bulk of liquid of the specific gravity of .8, which will be displaced. Then as $1. : .8 :: x + 100y : x \therefore x = 400y$; and as $1 : S :: x + ny : x = \frac{nSy}{1-S}$, whence $S = \frac{400}{400+n}$. In the hydrometer for liquids heavier than water, in which one hundred degrees represent a specific gravity of 1.2, this formula becomes $S = \frac{600}{600-n}$ and $x = 600y$. From these data the numbers in table No. II. are calculated.

It is obvious that the scale here described is applicable to all the purposes for which the hydrometer can be used; that it is easily convertible into terms of specific gravity, and that great advantages would result from the general use of this or one similar. Any part, high or low, of the scale, can be adapted to an instrument with perfect accuracy; and its range can be extended so as to include the lightest and heaviest liquids, and the value of tenths and hundredths of degrees ascertained and observed.

A disadvantage of this and the common hydrometer is, that if the degrees of the stem be sufficiently large for accurate observation, the range of the instrument becomes very limited, or the stem inconveniently long. In Nicholson's, which is a very correct but somewhat inconvenient hydrometer, this defect is obviated by surmounting the stem with a flat dish and sinking it with weights to a constant depth. In Aikin's and Sike's, weights are added to that part of the instrument which is immersed in the fluid, and the strength above or below a certain standard, represented by each weight, is measured on the scale. In this instrument a calculation is necessary of the value of each degree of the scale for every weight that is used, as both the weight and bulk of the hydrometer are altered thereby. There are none of them as simple in principle and as convenient in practice as the instrument now proposed, in which we can attain the same object (of shortening the stem and preserving its range) without altering the principle of the graduation.

Let the stem be of solid metal, drawn out to a perfectly uniform diameter, and the pear-shaped appendage to the bulb be loaded with an extra weight equal to eighty degrees of the stem. Let then the length of stem equal to twenty degrees be ascertained by experiment, and the stem cut off a little beyond that mark. This length can be measured off on an exactly similar rod of metal, and circular discs of the same density and weight, and pierced like the weights of Aikin's hydrometer, may be readily formed. If we take four of these, attach them to the summit of the stem and lighten the bulb till the instrument again sinks to the same mark in the same fluid, it will evidently give the same measurements as high as the twentieth degree, as if the weights were drawn out to the diameter of the stem and graduated to one hundred degrees. Let then one of the weights be taken from the top and attached below the ball of the instrument, and it will measure from twenty to forty degrees; if two are shifted it will measure from forty to sixty; from sixty to eighty, if three are shifted; and from eighty to one hundred, when all are immersed in the liquid.

The advantages of this arrangement are obvious; its principles are applicable to any number of degrees as well as to one hundred, and whatever part of the scale be taken for the range of the instrument.

The use of the hydrometer is much limited by the unequal expansion of different fluids by heat. It must always be used at the same temperature, unless the law by which the fluid expands be known. The various mixtures of alcohol and water, are the only liquids which have been subjected to experiments sufficiently multiplied to enable us to apply the requisite correction for heat.

The table No. I. is calculated from the very copious tables prepared by direction of the British Excise, and published in the Philosophical Transactions for 1794. It exhibits the per centage of alcohol of .825 specific gravity, indicated by each degree of the hydrometer for every five degrees of temperature, from 30° to 80° of Fahrenheit. The usefulness of this table will, it is believed, compensate for its length. Its accuracy is affected by the expansion of the instrument itself, which therefore requires to be investigated. The mean of the best experiments gives .00057 as the expansion in bulk of brass in passing from 32° to 212°. In graduating the hydrometer, the mean temperature of 55° is to be employed; so that the expansion is to be ascertained for twenty-five degrees. This will be .003167, or less than one-thirtieth of a degree; a quantity imperceptible to the eye. Of the other materials used in the construction of hydrometers, glass and platinum expand about half as much as brass, and gold and silver nearly in the same ratio.

TABLE NO. I.

The quantity of Alcohol of the specific gravity of .825 contained in 100 parts of Liquid for every degree of the Hydrometer, and every 5 degrees of Fahrenheit's Thermometer.

	30°	35°	40°	45°	50°	55°	60°	65°	70°	75°	80°
90											99.69
89										99.94	99.17
88										99.42	98.65
87									99.66	98.90	98.12
86								99.87	99.14	98.36	97.58
85								99.35	98.59	97.83	97.04
84							99.55	98.81	98.05	97.28	96.48
83						99.77	99.02	98.27	97.50	96.72	95.91
82					99.98	99.23	98.48	97.72	96.94	96.15	95.33
81					99.44	98.68	97.93	97.17	96.38	95.58	94.75
80				99.63	98.90	98.13	97.38	96.60	95.82	94.99	94.15
79			99.80	99.08	98.33	97.57	96.81	96.03	95.23	94.40	93.55
78		99.97	99.26	98.54	97.79	97.	96.24	95.45	94.64	93.80	92.94
77		99.43	98.70	97.98	97.22	96.43	95.65	94.87	94.04	93.19	92.32
76	99.58	98.88	98.14	97.41	96.64	95.83	95.06	94.26	93.42	92.56	91.68
75	99.03	98.32	97.57	96.82	96.05	95.23	94.45	93.64	92.79	91.93	91.04
74	98.47	97.76	96.99	96.23	95.45	94.62	93.83	93.	92.14	91.27	90.38
73	97.90	97.19	96.40	95.63	94.84	93.99	93.19	92.36	91.49	90.61	89.71
72	97.32	96.53	95.80	95.01	94.21	93.36	92.55	91.71	90.83	89.94	89.04
71	96.72	95.85	95.18	94.39	93.58	92.73	91.90	91.05	90.17	89.27	88.36
70	96.12	95.30	94.56	93.76	92.94	92.08	91.24	90.38	89.49	88.59	87.68
69	95.49	94.74	93.94	93.12	92.29	91.42	90.57	89.70	88.80	87.90	86.99
68	94.87	94.08	93.29	92.47	91.62	90.75	89.89	89.02	88.11	87.21	86.29
67	94.22	93,42	92.63	91.80	90.94	90.07	89.20	88.33	87.42	86.51	85.58
66	93.57	92.76	91,95	91.12	90.26	89.38	88.51	87.63	86.71	85.80	84.86
65	92 91	92,09	91.28	90.43	89.57	88.69	87.80	86.92	86.	85.08	84.13
64	92.25	91.42	90.59	89.72	88.86	87.97	87.08	86.20	85.27	84.35	83.40
63	91.58	90.75	89.88	89.	88.16	87.25	86.36	85.47	84.54	83.61	82.66
62	90.90	90,03	89.16	88.29	87.46	86.52	85.63	84.72	83.79	82.86	81.91
61	90.21	89.31	88.44	87.57	86.71	85.78	84.89	83.97	83.04	82.10	81.15
60	89.48	88.58	87.71	86.83	85.95	85.03	84.14	83.21	82.27	81.33	80.38
59	88 74	87,83	86.98	86.09	85.20	84,28	83.37	82.45	81.50	80.55	79.60
58	87.99	87,08	86.22	85.34	84.44	83.51	82.59	81.67	80.72	79.76	78.79
57	87.24	86.33	85.45	84.58	83.67	82.73	81.81	80 89	79.93	78.96	77 97
56	86.47	85.57	84.69	83.79	82.89	81.94	81.03	80.09	79.13	78.15	77.15
55	85.69	84.79	83.91	82 99	82.09	81.15	80.23	79.29	78 32	77.34	76.33
54	84.90	84.	83.12	82.20	81.29	80.35	79.43	78.40	77.49	76.51	75.51
53	84.10	83.20	82.31	81.39	80.47	79.54	78.60	77.61	76.65	75.67	74.68
52	83.30	82.41	81.51	80.58	79.66	78.72	77 77	76.74	75.82	74.84	73.84
51	82.49	81.55	80.69	79.77	78.84	77.89	76.93	75.96	74 99	74.	73.
50	81.66	80.76	79.85	78.93	77.99	77.04	76.03	75.07	74.11	73.12	72.12
49	80.83	79.93	79.01	78.08	77.14	76.18	75.13	74.18	73.23	72.23	71.24
48	79.99	79.08	78.15	77.22	76.28	75.32	74.30	73.35	72.37	71.36	70.33
47	79.14	78.22	77.28	76.35	75.41	74.46	73 48	72.49	71.50	70.48	69.42

TABLE NO. I. CONTINUED.

	30°	35°	40°	45°	50°	55°	60°	65°	70°	75°	80°
46	78.27	77.36	76.41	75.47	74.53	73.56	72.58	71.58	70.58	69.55	68.49
45	77.40	76.48	75.53	74.59	73.65	72.66	71.67	70.67	69.66	68.61	67.55
44	76.51	75.60	74.63	73.69	72.75	71.75	70.74	69.75	68.72	67.66	66.59
43	75.62	74.70	73.72	72.78	71.84	70.84	69.80	68.82	67.78	66.70	65.62
42	74.71	73.78	72.81	71.85	70.89	69.86	68.84	67.89	66.80	65.74	64.59
41	73.79	72.85	71.89	70.92	69.94	68.88	67.87	66.85	65.83	64.77	63.56
40	72.85	71.90	70.93	69.95	68.96	67.91	66.89	65.91	64.85	63.77	62.77
39	71.90	70.93	69.97	68.97	67.97	66.94	65.90	64.87	63.85	62.76	61.68
38	70.92	69.95	68.97	67.97	66.96	65.94	64.90	63.86	62.84	61.72	60.64
37	69.93	68.96	67.97	66.96	65.95	64.93	63.90	62.84	61.77	60.68	59.59
36	68.92	67.95	66.95	65.93	64.91	63.89	62.86	61.80	60.72	59.63	58.54
35	67.90	66.92	65.92	64.90	63.87	62.84	61.81	60.75	59.67	58.58	57.48
34	66.86	65.86	64.88	63.84	62.80	61.76	60.72	59.66	58.58	57.49	56.38
33	65.82	64.81	63.82	62.78	61.73	60.68	59.63	58.56	57.49	56.39	55.28
32	64.75	63.71	62.74	61.69	60.63	59.58	58.52	57.45	56.37	55.15	54.12
31	63.66	62.61	61.65	60.59	59.53	58.47	57.40	56.33	55.25	54.11	52.96
30	62.56	61.55	60.54	59.47	58.40	57.33	56.25	55.15	54.04	52.91	51.79
29	61.44	60.44	59.42	58.34	57.26	56.18	55.10	53.97	52.83	51.70	50.58
28	60.31	59.29	58.26	57.16	56.07	54.97	53.87	52.74	51.60	50.46	49.32
27	59.16	58.10	57.05	55 97	54.88	53.76	52.63	51.50	50.37	49.21	48.01
26	57.96	56.89	55.81	54.75	53.60	52.48	51.35	50.20	49.06	47.89	46.70
25	56.72	55.65	54.55	53.43	52 31	51.19	50.06	48.90	47.74	46.56	45.38
24	55.45	54.32	53.25	52.11	50.98	49.84	48.68	47.53	46.37	45 17	44.
23	54.15	53.03	51.91	50.78	49.65	48.48	47.30	46.15	44.99	43.79	42.59
22	52.75	51.70	50.54	49.36	48.21	47.02	45.85	44.69	43.51	42.33	41.27
21	51.34	50.31	49.15	47.94	46.76	45.56	44.40	43.23	42.02	40.82	39.58
20	49.92	48.84	47.63	46.44	45.25	44.04	42.87	41.68	40.46	39.29	37.99
19	48.50	47.26	46.09	44.88	43.67	42.46	41.27	40.04	38.83	37.58	36.35
18	46.86	45.65	44.46	43.21	42.01	40.79	39.55	38.30	37.09	35.86	34.62
17	45.21	43.99	42.76	41.47	40.26	39.01	37.77	36.53	35.29	34.05	32.80
16	43.44	42.20	40.90	39.63	38.38	37.13	35.89	34.59	33.40	32.16	30.90
15	41 54	40.24	38.97	37.65	36.37	35.10	33.87	32.59	31.38	30.18	28.93
14	39.38	38.11	36.83	35.48	34.19	32.93	31.71	30.47	29.28	28.10	26.87
13	37.11	35.80	34.48	33.13	31.83	30.62	29.43	28.25	27.10	25.97	24.80
12	34.49	33.14	31.86	30.52	29.30	28.14	27.02	25.92	24.83	23.73	22.69
11	31.44	30.08	28.99	27.74	26.59	25.53	24.52	23.51	22.51	21.50	20.57
10	27.99	26.84	25.88	24.80	23.84	22.89	21.99	21.09	21.07	19.24	18.27
9	24.30	23.40	22.60	21.82	21.07	20.24	19.46	18.64	17.82	16.97	15.97
8	20.53	20.03	19.50	18.90	18.29	17.61	16.92	16.23	15.48	14.72	13.87
7	17.05	16.80	16.49	16.07	15.64	15.05	14.48	13.85	13.18	12.15	11.73
6	13.91	13.84	13.66	13.38	13.03	12 59	12.12	11.56	10.97	10.43	9.63
5	11.18	11.15	11.17	10.18	10.63	10.26	9.85	9.37	8.83	8.25	7.58
4	8.49	8.68	8.65	8.55	8.34	8.04	7.69	7.27	6.76	6.23	5.63
3	6.33	6.42	6.44	6.39	6.13	5.94	5.63	5.24	4.52	4.34	3.72
2	4.20	4.35	4.38	4.35	4.19	3.97	3.68	3.32	2.89	2.39	1.87
1	2.33	2.43	2.45	2.43	2.28	2.08	1.81	1.44	1.10	.87	.74

TABLE NO. II.

The specific gravity corresponding with each degree of the Hydrometer, from 1° *to* 200°, *for liquids lighter, and for those heavier than water.*

deg.			deg.			deg.		
1	.99751	1.00167	38	.91324	1.06761	75	.84210	1.14285
2	.99502	1.00334	39	.91116	1.06934	76	.84032	1.14504
3	.99256	1.00502	40	.90909	1.07143	77	.83857	1.14722
4	.99010	1.00671	41	.90703	1.07334	78	.83682	1.14942
5	.98765	1.00840	42	.90498	1.07527	79	.83507	1.15163
6	.98522	1.01010	43	.90293	1.07720	80	.83333	1.15384
7	.98280	1.01180	44	.90090	1.07913	81	.83160	1.15607
8	.98039	1.01351	45	.89888	1.08108	82	.82987	1.15830
9	.97799	1.01523	46	.89686	1.08303	83	.82816	1.16054
10	.97561	1.01695	47	.89485	1.08499	84	.82645	1.16279
11	.97324	1.01867	48	.89286	1.08696	85	.82474	1.16548
12	.97087	1.02041	49	.89087	1.08711	86	.82304	1.16731
13	.96851	1.02214	50	.88889	1.09091	87	.82135	1.16959
14	.96618	1.02389	51	.88691	1.09289	88	.81967	1.17187
15	.96385	1.02564	52	.88495	1.09489	89	.81800	1.17416
16	.96154	1.02740	53	.88303	1.09689	90	.81633	1.17647
17	.95923	1.02915	54	.88106	1.09890	91	.81466	1.17878
18	.95694	1.03092	55	.87912	1.10092	92	.81301	1.18110
19	.95465	1.03270	56	.87719	1.10294	93	.81136	1.18343
20	.95238	1.03448	57	.87527	1.10495	94	.80972	1.18577
21	.95012	1.03627	58	.87336	1.10701	95	.80808	1.18812
22	.94787	1.03806	59	.87146	1.10906	96	.80643	1.19047
23	.94563	1.03986	60	.86956	1.11111	97	.80483	1.19284
24	.94340	1.04167	61	.86768	1.11317	98	.80321	1.19522
25	.94118	1.04348	62	.86580	1.11524	99	.80161	1.19765
26	.93897	1.04529	63	.86393	1.11732	100	.80000	1.20000
27	.93677	1.04712	64	.86207	1.11940	101	.79843	1.20405
28	.93458	1.04895	65	.86021	1.12149	102	.79681	1.20482
29	.93240	1.05078	66	.85837	1.12359	103	.79523	1.20724
30	.93023	1.05263	67	85653	1.12570	104	.79365	1.20967
31	.92807	1.05448	68	.85470	1.12782	105	.79208	1,21212
32	.92593	1.05634	69	.85288	1.12996	106	.79051	1.21457
33	.92379	1.05821	70	.85106	1.13208	107	.78895	1.21703
34	.92166	1.06007	71	.84926	1.13421	108	.78740	1.21951
35	.91954	1.06194	72	.84746	1.13636	109	.78585	1.22199
36	.91743	1.06383	73	.84567	1.13852	110	.78431	1.22449
37	.91533	1.06572	74	.84388	1.14068	111	.78278	1.22699

TABLE NO. II. CONTINUED.

deg.			deg.			deg.		
112	.78125	1.22951	142	.73801	1.31004	172	.69930	1.40187
113	.77959	1.23203	143	.73665	1.31291	173	.69808	1.40515
114	.77840	1.23457	144	.73529	1.31579	174	.69686	1.40845
115	.77669	1.23711	145	.73394	1.31868	175	.69565	1.41176
116	.77519	1.23967	146	.73260	1.32158	176	.69444	1.41509
117	.77369	1.24223	147	.73126	1.32450	177	.69324	1.41844
118	.77220	1.24481	148	.72992	1.32743	178	.69204	1.42180
119	.77071	1.24740	149	.72859	1.33037	179	.69084	1.42518
120	.76923	1.25000	150	.72727	1.33333	180	.68966	1.42857
121	.76775	1.25261	151	.72595	1.33630	181	.68846	1.43198
122	.76628	1.25523	152	.72464	1.33929	182	.68728	1.43541
123	.76482	1.25786	153	.72333	1.34228	183	.68611	1.43885
124	.76335	1.26050	154	.72202	1.34529	184	.68493	1.44231
125	.76190	1.26316	155	.72072	1.34831	185	.68376	1.44578
126	.76045	1.26582	156	.71942	1.35135	186	.68260	1.44987
127	.75901	1.26850	157	.71813	1.35440	187	.68143	1.45278
128	.75757	1.27118	158	.71684	1.35747	188	.68027	1.45679
129	.75614	1.27388	159	.71556	1.36054	189	.67912	1.45985
130	.75472	1.27659	160	.71428	1.36364	190	.67797	1.46341
131	.75329	1.27932	161	.71301	1.36674	191	.67682	1.46699
132	.75188	1.28205	162	.71174	1.36986	192	.67567	1.47058
133	.75047	1.28480	163	.71048	1.37300	193	.67453	1.47420
134	.74906	1.28755	164	.70922	1.37614	194	.67340	1.47783
135	.74766	1.29032	165	.70796	1.37931	195	.67225	1.48148
136	.74627	1.29310	166	.70671	1.38249	196	.67114	1.48515
137	.74488	1.29589	167	.70546	1.38568	197	.67002	1.48884
138	.74349	1.29892	168	.70422	1.38888	198	.66889	1.49254
139	.74211	1.30152	169	.70299	1.39211	199	.66778	1.49626
140	.74074	1.30435	170	.70175	1.39535	200	.66667	1.50000
141	.73937	1.30719	171	.70052	1.39860			

Value in degrees of the New Scale.

Sulphuric ether (Lowitz) .632,	233°
Dr Paris .739,	141
Dublin .765,	123
Edinburgh .758,	128
Spirit of nitrous ether,	71
Aq. ammoniæ, Dublin .936,	27
London .960,	17

Muriatic acid 1.16,	83°
Nitrous acid 1.50,	200
Sulphuric acid 1.848,	275
100 degrees of the brewer's saccharometer 1.100 sp. gr.	54½
38 degrees of Baumè's hydrometer for spirits,	83½
18 degrees of do.	24½

3 degrees of the new scale equals 1 of Baumè; to reduce it to Baumè's, divide by 3 and add 10.

72 degrees of Baumè's hydrometer for salts, equals	300°
24 degrees of do.	100

To reduce the new scale to Baumè's, multiply by 12 and divide by 50.

Pinus Canadensis, Willd. Abies Canadensis, Mich. Sylv. A large tree belonging to the natural order Coniferæ. Monoecia, Monadelphia of Linnæus. Officinal Resin Pini Canadensis. Hemlock Resin. By Charles Ellis.

This resin is the product of the pinus Canadensis, a tree known only in the United States by the name of hemlock spruce, and in Canada by the French is called pèrusse.

The resin which exudes from it was first introduced into this city about ten or twelve years since, and was obtained in this state near Silver Lake, Susquehannah county.

Since then there have been annually small quantities brought from the northern parts of Pennsylvania. But its history even here has been but little known, and still less elsewhere. And as every thing connected with the pharmacy of our own country is interesting, and ought particularly to engage our attention, I have attempted to give a short account of the article itself, the tree from which it flows, and the mode of obtaining it.

For the history of the tree, I have chiefly consulted Michaux's North American Sylva, and am indebted to the politeness of Mr Christian, an intelligent gentleman of Susquehannah county, for some practical details respecting the resin.

The pinus Canadensis is a native of North America only, and belongs to the coldest regions of our continent, beginning to appear about Hudson's Bay, lat. 51° north. In the vicinity of Lake St John, and near Quebec, the forests are filled with it, and in Nova Scotia, New Brunswick, Maine and Vermont, it forms three-fourths of the evergreen woods, of which the other fourth is composed of the abies nigra or black double spruce.

It is also abundantly met with in the northern parts of Pennsylvania and New York. Further south it is confined to the Aleghany mountains, and even there to the borders of torrents, and to the most humid and gloomy situations. Very moist ground is not, however, most congenial to its growth, but it is often seen flourishing amongst beech and sugar maple, in a soil well adapted for the culture of wheat.

The hemlock spruce is always taller and thicker than the black spruce. It attains the height of seventy or eighty feet, and a circumference of six to nine feet; preserving the same diameter two-thirds of the length of its trunk. But if the number and closeness of its concentric layers afford a certain criterion of the longevity of trees, and the rapidity of their vegetation, it must be nearly two centuries in acquiring such dimensions.

The leaves are six to eight lines long, very narrow, flat and downy at their unfolding. The cones are a little longer than the leaves, oval, pendulous and situated at the extremity of the branches.

Of all the great resinous trees of America, its wood is of least value; but this disadvantage is greatly compensated by the invaluable property which the bark possesses in its tannin; particularly as in those sections of our country where it is most abundant, the oak is least so. And although a preference be given to the bark of the quercus falcata, that of the hemlock spruce in some parts of the United States is almost entirely consumed in the tanneries.

Mr Michaux states, that this species of fir contains very little resin, having observed that none of any consequence was apparent upon the trunks of trees that had long been deprived of their bark. In comparison with the species from which the common turpentine exudes, this remark is correct; but the circumstances under which the resin flows from the former, so materially differ from the latter, that any inference drawn from a transient observation of the tree, would lead to an erroneous conclusion. The hemlock resin can never be obtained by incisions in the trunk, (the mode of procuring turpentine), but is invariably the result of spontaneous exudation, generally at the knots or excrescences, which are numerous on this tree. The heat of the sun causes it to distil through the bark, and it hardens upon the surface.

It is always obtained from old trees, and generally in a state of approaching decay. When observed to exude from such as are healthy and vigorous, the inference is that they will not live long, and it is considered in the country a certain forerunner of premature death. The proportion of trees from which any resin can be procured is not more than one in one hundred; and to this circumstance we may attribute the scanty supply always found in our market. The mode of obtaining it employed by the inhabitants is as follows. Trees are selected upon whose bark the resin is encrusted, which are easily designated by a streak of a dark brown colour on one side of the tree, from near the top to the bottom. These are cut down, and the bark upon which the resin has hardened stripped off and thrown into a kettle containing water, with weights placed upon it to prevent its floating. By boiling the water, the resin is melted and rises to the surface, is skimmed off and thrown into cold water. It is then put into a coarse linen bag and submitted to a second ebullition, treating it as in the former instance, which deprives it of many of its impurities, and in this state we receive it from the country. The quantity procured from such as are considered *good* trees, is from six to ten pounds, the average produced from four to five. The colour of it as it exudes is nearly white. It hardens immediately, and changes to yellow, brown, and sometimes nearly black.

The well known fact is noticed by Michaux, that the large and bushy top of the hemlock receives and retains quantities of snow; from the weight of which and from its bleak and elevated exposure, the limbs are broken off and fissures produced in the trunk: thus is brought about a tendency to decay, and this spontaneous exudation of resin is probably the effect of a diseased or altered action in the vital powers of the tree.

The hemlock resin, or *gum*, as it is generally but very erroneously called, as received from the country, is in masses, very brittle, and of a yellowish brown colour; the heat to which it is generally submitted by the apothecary, to deprive it of its impurities, renders it a few shades darker.

Owing to its adhesiveness and stimulating properties, it has acquired some confidence and popularity as a strengthening plaster; and is, when employed in this way, quite equal, if not superior, to the Burgundy pitch. In its chemical properties it is essentially a resin, combined with a small quantity of volatile oil, and is, like other resins, heavier than water, having a specific gravity of 1.034.

One part of it is soluble in two parts of warm and three of cold alcohol. It is highly inflammable, burning with a thick black smoke, and resembles in many respects the resin of the pinus australis, or common turpentine, but differs from it materially in its consistence and odour. The latter is so peculiar, that once observed it may be readily recognized. Oil of turpentine dissolves barely sufficient of it to acquire its colour, but it is entirely soluble in sulphuric ether. At a temperature of 198° it fuses, but requires a heat of 300 or 350, when subjected alone in a retort to distillation, to deprive it of its essential oil, which is in very small quantity. Distilled with water or alcohol the products were strongly impregnated with its odour. I have found by pulverising and passing it through a sieve, it may be deprived of the bark of the tree, with more or less of which it is invariably mixed. This is, however, but an imperfect mode of purifying it, as without great care part of the bark will also be reduced to powder. The operation of straining, although attended with some difficulty, on account of the great adhesiveness of the resin, and the rapidity with which it cools, is nevertheless the only economical and effectual method, and may be readily accomplished over boiling water, or by means of professor Hare's apparatus for facilitating filtration by heat, described in his chemistry. It may also be purified by dissolving it in alcohol, filtering the solution, and evaporating it over a water bath. This plan is too expensive.

On the Ipomœa Jalapa. By Daniel B. Smith.

The plant from which the officinal jalap is obtained, has always been the subject of much uncertainty. It was supposed at one time to be a species of briony, and at another of rhubarb, and has also, even to the present day, been confounded with the mechoacan. Linnæus at one time attributed it to a species of mirabilis, to which he gave the name of mirabilis jalapa. But he afterwards changed his opinion, and supposed it to be the convolvulus jalapa, which he thus describes, "Convolvulus foliis difformibus, cordatis angulatis oblongis lanceolatisque, caule volubili, pedunculis unifloris."

The first writer by whom this celebrated drug was noticed was Monard, who wrote, about the year 1570, a history in Spanish, of Remedies brought from America. He notices the distinction between the jalap and mechoacan, of which latter plant he gives several plates. His description of the two roots is clear and well defined, and may be seen in Coxe's American Dispensatory, article jalap.

Thiery de Menonville, who visited the native country of the jalap in 1777, described a plant which he found growing near Vera Cruz, and asserts it to be identical with that from which the jalap is obtained.

This plant was found to correspond in every particular with one which the elder Michaux had sent to the Botanic garden of Paris from East Florida. Michaux's plant is a true ipomœa, and is called by him ipomœa macrorhiza, or large rooted ipomœa. Persoon adds a query to Michaux's description, whether it is not the convolvulus jalapa of Linnæus? Desfontaines described and figured the plant of Michaux, in the second volume of the Annales du Museum, as the officinal jalap, and asserts it to be a native of the southern United States. It is also figured as such in Curtis' Botanical Magazine, T. 1572. This plant, which appears to be the convolvulus mechoacana of Linnæus, is very probably that which yields the mechoacan, and which was formerly considered as a briony—Bryonia Mechoacana Nigricans. As this root was frequently intermixed by the collectors with the true jalap, it is not surprising that Thiery de Menonville should have confounded the two species together, nor that Persoon and Desfontaines were led into the same error. These circumstances further render it probable, that the plant which has been cultivated in Europe, has not been the true jalap. That which Dr Woodville has figured in his Medical Botany, was introduced into the royal gardens at Kew by M. Thouin, and it is remarked by Nuttal, that it "much more nearly resembles the convolvulus panduratus, (particularly an entire leaved variety of the western states), than Michaux's large rooted ipomœa." The specimen in the Jardin des Plantes, is undoubtedly Michaux's species, for the root was brought from Charleston, where that botanist successfully cultivated it. Pursh, in his Genera of North American Plants, describes the macrorhiza by the name of ipomœa jalapa, and considers it as established, that it is the officinal species. He was confirmed in this opinion by seeing the living plant raised from some seeds collected in Mexico, "which, says he, proved in every respect to be the convolvulus jalapa of Linnæus, as well as ipomœa macrorhiza of Michaux, with only the small difference of colour, which was a light purple." Notwithstanding all this weight of authority, it is nearly certain that Michaux's plant is the mechoacan and not the jalap, for the root sometimes weighs from fifty to sixty pounds, a size which the jalap does not attain.

The obscurity which has so long hung over this subject, it may be hoped, is at length dissipated, and it may be considered as a settled question. Through the kindness of a friend, Dr Redman Coxe, of the University of Pennsylvania, in the summer of 1827, obtained a number of plants in a growing state from Xalapa, and he has successfully cultivated them in his garden since that time. The following extracts from a memoir of the learned professor, published in the American Journal of the Medical Sciences for February 1830, are nearly conclusive on the point of the identity of his plant with the true jalap.

"It is not my intention to take up much time in the consideration of the subject which this paper is intended to embrace, viz. the real character of the plant that affords us the officinal jalap. It will be seen by referring to the preceding observations, that although it has been one of the most prominent and approved articles of the Materia Medica for nearly two centuries, the absolute character of the plant producing it has been involved in obscurity. Desirous of bringing it fully to light, I attempted repeatedly to obtain the living plant from its domestic source, but unfortunately was unsuccessful in my endeavours, until, in the year 1827, I obtained, by the kind attention of Mr Fontanges, a number of the plants in a growing state, which he had the goodness to procure from Xalapa. The following statement may be considered as a diary of the facts which have since come to my knowledge. During three years successively, the plants have grown with great luxuriance in my garden; and, with the exception of fully ripening their seeds, have abundantly repaid me for the anxious interest I felt respecting them.

"On the 8th of June 1827, I received the plants from Mr Heyl, to whose care they had been consigned.

"The shoots, eight or ten in number, I found to have suffered from the voyage. They resembled the *convolvulus*, but of a sickly growth, about six to ten inches high, and with several small cordate leaves upon each stalk. Supposing an immediate transplantation might benefit them, I put out two or three of the bulbs or tubers into the open ground on the same day, and planted some others in pots, in the *same earth* in which they had reached me. All of these last unfortunately died: this I presume must have arisen from the earth being impregnated with salt water, and which was probably the cause of the primary unhealthy state of the whole number. It was fortunate therefore that I had placed some in the garden, where I soon had the pleasure of seeing them give out fresh and vigorous shoots, which grew rapidly, so that by the beginning of July they began to wind around a string I had prepared for them. They continued to grow with increased vigour, the leaves enlarging as the stalk advanced; and by the beginning of September they had attained a height of about twelve feet, several buds beginning to put forth very slowly, and not opening in flower until the beginning of November. Indeed, owing to the frost, only one of them came to perfection; and this one was secured from the same fate with the elegant buds that were on the point of expanding, by cutting off a section of the plant and putting it into water in a warm room: from this flower the first drawing I had made was taken, having a beautiful lilac or carnation waxy transparent colour.

The leaf differs entirely from that given by Woodville in his Medical Botany; as does the whole appearance of the flower: but I have since found much diversity in the leaves, as may be seen in the engraving; yet although thus differing among themselves, they were *always* cordate. At each leaf two small buds appeared, and in a few instances three, on the uppermost branches or offsets, each on its own particular footstalk. The common *convolvulus* or *ipomœa* of our gardens, I found to have a diversity of buds, even up to five, arising from the same part of the plant as in the jalap, viz. from the angle formed by the leaf with the stem.

Excepting the leaves, the plant appeared scarcely more than a reddish-brown thread, about the size of a crow-quill, to the height of twelve or fourteen feet; from thence, at the junction of nearly every leaf, an off-set originated, growing luxuriantly to the length of several feet: the whole length of the plant must have been twenty to twenty-five feet, the numerous offsets springing forth nearly the whole extent, and each in turn affording axillary offsets. There were probably about twenty buds of different sizes, of the most beautiful appearance, that were destroyed by the frost; the longest, by admeasurement on October 23d, including the peduncle and calyx, fully two inches. The leaves were throughout solitary and alternate, cordated, and from one to three inches long, including the footstalk. The stem, besides twining round its support from left to right, having a strong disposition to twist upon itself throughout.

The frost destroyed the flowers before even evincing a disposition to seed, and as the cold increased, being fearful of trusting the roots during winter to the open air, I took them up on the 21st of November, and planted them in a pot in the house on the same day; keeping them in a warm room the whole winter, and slightly moistening the earth occasionally.

On the 12th of April 1828, I found three small shoots beginning to appear, which by the 29th of the month were between two and three inches high; on which day I planted one out in the open air. On the 7th of May small cordate leaves began to appear; the slender reddish stem had commenced twining around an adjoining twig; and, counting the convolutions, was now full five inches in height. By the 17th it had grown to fully twelve inches, the leaves augmenting in size and number.

June 1. Including the convolutions, it is now nearly four feet high, and by the 8th was nearly six inches higher, extremely vigorous, and beginning to display the appearance of small offsets from the upper leaves. In breaking off a leaf, I found a milky juice exude in small amount, and of little taste.

16th. It is now between six and seven feet high, and has about fifty vigorous leaves of a vivid green.

July 1st. Now upwards of eight feet high, with five or six vigorous offsets from the axillæ of the upper leaves, and fresh ones forming.

This plant continued to thrive vigorously, and probably reached the height of twenty feet. Several minute buds made their appearance; but not one came to perfection, either on this, or the others, which grew with equal luxuriance; so that

I was completely disappointed in my expectation of becoming acquainted with the seeding of the plant, from its having had a start of growth many weeks beyond that of the preceding year. The frost coming on, I took up the pot in which it was planted, and preserved it in the house during the winter, the stem gradually dying down. In this state it continued, being occasionally slightly watered, until early in the month of April 1829, when I took it up, and found it considerably enlarged, and left it exposed to the air for some days, during which time it became wrinkled and seemed drying into the corrugated form in which the imported root appears: I therefore replanted it, and placed it in the garden, and on the 18th of April I noticed it shooting from the earth. By the 25th, a small stem, about three inches long, was beginning to twine around an adjoining stick, and the same day a second shoot made its appearance. May 4th. A small cordate leaf appeared on the first stalk, now nearly a foot high. It continued rapidly to increase, and by the 27th of June it had numerous offsets from the junction of the upper leaves with the stem, being now about fifteen feet high; and on these offsets, fifteen or twenty buds seemed to be progressing, of different sizes, so that by comparing the statements of the preceding years, it will be found to have far advanced before them.

The storms we experienced on and about the 4th of July of this year, extinguished my anxious expectations, by beating off every bud then upon the plant, although many very vigorous fresh offsets put forth from the main stem, as it progressed in height. By the 20th of August, it was full twenty feet in height, but without the appearance of a new bud. Having given up all hopes of its efflorescence, I paid but little attention to it; but about the middle of September I was agreeably surprised at perceiving several small buds pushing forth, which, by the 20th of October, had greatly augmented, perhaps not less than one hundred, and some of the most forward being now nearly one inch and a half in length.

October 23d. I measured one, and found it, including its footstalk, to be three inches long; and on this day one of the flowers expanded, continued open all that night and the next day, and falling off on the 25th, when the seed-vessel, to which the pistillum continued attached, was of a considerable size. Another flower opened on the 25th, and fell off the next day, leaving a seed-vessel of sufficient size to induce me to hope that seed might be perfected. After this, probably fifteen or twenty buds flowered very beautifully; and from one foot-stalk, in some places two buds were seen, in others, three.

All my expectations were however blasted by the severe frost that came on about the middle of November, and completely destroyed every sign of life in the plant; which I was unable to remove into the house, from the complete intertwining of the offsets in every part, amongst themselves and the adjoining plants. The pot of earth, moreover, in which were the tubers, was frozen throughout, and I of course expected they were killed; I took it however into the house, and allowed it to thaw gradually in a cool room—and in four or five days, with a heavy heart, I removed the earth, and found my tuber vigorous and healthy, increased greatly in size, nearly as large as an orange, and in every respect resembling in colour and appearance a dark skinned potato. Numerous suckers proceeded from it, from which fine radicles arose, and three new tubers were formed of the size of nutmegs; several offsets were shooting towards the surface of the earth; all which, after procuring their delineation, I planted again in about a week, where they now remain for further elucidation.

The skin of the tuber is very thin, and the whole habitude of this interesting plant, below the surface, seems closely allied to the common potato. Dark as is the appearance of the dried tuber as used in medicine, when fresh, its internal aspect is as white as a potato, but soon is clouded by atmospheric exposure.

I have now given, as concisely as I could, all the particulars I have learned of this long disputed plant; which turns out to be an *ipomœa* and not a *convolvulus*. The difference indeed is trifling—but it is no small matter in a disputed point, to completely settle the ground of controversy. I had a drawing made of my first year's flower, and this year another; to this last I was enabled to add the tubers and their offsets, so that nothing remains to be known respecting the plant, but the character and number of the seeds; this I hope to accomplish another season. The engraving accompanying this statement is an intermixture of the two drawings above mentioned, in order to give a view of the diversity of the leaves, in the two cases.

For the botanical description, I am indebted to my friend Mr Nuttall, so well known for his extensive attainments in the science of botany. It might possibly have been more complete had he seen it in its state of perfection. The following is his description of it:—

IPOMŒA JALAPA.—*Root.* A roundish, somewhat pear-shaped tuber; externally blackish; internally white when recent —and warty*; sending out long fibres from its lower point†; and also from the upper root stalks produced, which appear to be a portion of a persisting succulent stem.

Stem. Round, (apparently), herbaceous, of a bright brown colour‡, and very much inclined to twist; and, as well as the whole plant, perfectly smooth.

Leaves. Heart shaped, entire, smooth, conspicuously acuminated, and deeply sinuated at the base: the lower ones sometimes nearly hastate, or with diverging angular points: the under surface prominently veined: the footstalks often nearly the length of the lamina of the leaf, from the point of its insertion.

Peduncles. About the length of the petioles, bearing commonly *two*, more rarely *three* flowers.

Calyx. Without bracts, five-leaved, obtuse; two of the divisions external.

---

* This appears rather the result of desiccation—for when fresh taken from the earth, it is not more so than the potato. Mr N. had the opportunity of seeing it only after it had been some time exposed to the air. C.

† This was the case in the tuber examined by Mr N. but the engraving will show, that, as in the potato, there are many eyes from which these fibres are transmitted, often as thick as a quill, and from which, in various places, proceed the radicles that nourish the plant. C.

‡ Rather reddish when fresh—Mr N. having the opportunity of only examining the dry stalk. C.

Corolla. Funnel-formed, wholly lilac purple, (and of a waxy semitransparency. C.)

Stamina. Five; anthers oblong, white; somewhat exserted.

Pistillum. Germ slender and attenuated into the style. (Observation on an imperfect flower. C.) *Stigma.* Capitate, simple.

Seed. As yet unknown.

Explanation of the Plates.

Plate I. Fig. 1. The plant winding round its support.

- *a.* A full expanded flower of the natural size.—Connected with it (*aa*). is seen the germen and pistillum of another flower, the corolla of which had fallen off.
- *b.* A bud nearly on the point of expanding, with another less advanced.
- *c.* Three buds of different sizes—all proceeding from one common footstalk connected with the stem—each, however, having a separate one of its own.
- *d.* A leaf as it appeared on the plant of 1827—cordate—but varying much from the leaves in 1829—upper surface.
- *e.* Leaf of the plant in 1829—upper surface.
- *f.* Leaf of the plant in 1829—lower surface.
- *g.* Leaf separate—of largest size.

Fig. 2. The flower divided longitudinally, and opened, to show its five stamina.

Fig. 3. The pistillum and its capitated stigma, together with the calyx.

Fig. 4. The pistillum, showing its junction with the germen, in an unexpanded flower, after removing the calyx.

Fig. 5. The stem as it issues from the earth, showing its connexion with the stolones springing from the tuber.

- *a.* The stem.—*b.* Stolones, or suckers.—*c.* Tuber in outline.

Plate II. Fig. 1. *a.* Tuber—third year's growth—natural size.—*b.* Stolones arising from the tuber.—*c.* Radicles sent off from the stolones for the nourishment of the plant.—*d.* Small shoots from the stolones, about to emerge from the earth.—*e.* Small tubers from the stolones, of this year's growth.—*f.* Stem.

Fig. 2. A tuber cut in half, in order to show its internal white appearance, when fresh.

☞ In order to test the purgative power of the bulb, I sacrificed one of the smaller, which when dried yielded me thirty grains of powder—of this, twenty grains were given to a healthy person, and purged him twice, producing watery stools, with some griping.

Ten grains, given to another healthy individual, produced no effect. It may, therefore, so far as this experiment goes, be regarded as equal in power to the imported root.

By comparing the foregoing botanical description by Nuttall, with the following, which are given in Curtis' Botanical Magazine, and which refer unquestionably to the plant of Michaux, there can be no doubt that these species are entirely distinct. It is surprising that Dr Coxe, with all these facts before him, should have called his plant ipomœa jalapa vel macrorhiza. Should further research establish the fact that Dr Coxe's is the true jalap plant, it will be entitled to the name ipomœa jalapa, and at all events can never be confounded with the ipomœa macrorhiza.

CONVOLVULUS JALAPA.

Pentandria Monogynia.

Cor. campanulata plicata, stigmata 2, caps; bilocularis: loculis dispermis.

Specific Character and Synonyms.

Convolvulus jalapa; foliis cordatis repandis integris lobatisve *subtus lanatis,* pedunculis 1—3-floris, pedicellis petiolisque biglandulosis semine lanigero.

Convolvulus jalapa; caule volubili, foliis ovatis subcordatis obsolete repandis subtùs villosis, pedunculis unifloris.—*Hort. Kew.* 1. *p.* 211. *ed. alt.* 1. *p.* 332. *Willd. Sp. Pl.* 1. *p.* 860.

Convolvulus jalapa; caule volubili, tuberculoso; foliis cordato-ovatis, subrugosis, subtùs villosis, integris aut lobatis; pedunculis uni vel multifloris: filamentis basi tomentosis; semine lanigero.—*Desfont. in Annales du Mus. d'Hist. Nat.* 2. *p.* 126. *t.* 40. *et.* 41.

Ipomœa macrorhiza; radice crassissima; foliis subùts tomentosis, cordatis, simplicibus lobatisque, plicatis; pedunculis subunifloris; calycis foliolis ovalibus muticis: corolla alba grandi; seminibus prolixè lanuginosis.—*Michaux, Fl. Bor. Am.* 1. *p.* 141.

Ipomœa jalapa; pubescens; foliis cordatis integris lobatisque plicato rugosis, pedunculis 1—3-floris, foliolis calycis ovalibus, muticis, corollis campanulatis, seminibus prolixè lanuginosis, radice crassissima.—*Pursh. Fl. Bor. Am. p.* 126, *inedit.*

Curtis adds that his figure was taken from a plant raised by A. B. Lambert, Esq. from seeds received from Mexico.

"The jalap was carried from the neighbourhood of Vera Cruz to Jamaica, by Dr Houston, but was neglected and lost.

"Seeds sent to Miller by Dr Houston, grew in the apothecaries' garden, and the plant is described in the sixth edition of the Gardener's Dictionary, published in 1733; but the leaves, probably from mistake, *are there said to be smooth.*"

The root of the jalap occurs commonly in transverse slices, and in egg-shaped, somewhat pointed, entire tubers, covered with a very thin, wrinkled brown cuticle. That which is hard, heavy, compact and breaks with a resinous fracture is the best, and the tubers are to be preferred as not liable to be adulterated, which the jalap in slices frequently is.

The fracture of good jalap is resinous, of a yellowish gray colour, interspersed with deep brown concentric circles. It has a sweetish heavy odour when broken, and a sweetish, slightly pungent taste. Its powder is of a pale brownish yellow colour, very nauseous to the taste, and strongly affecting the throat and nostrils, when received with the air in breathing.

This root has been analysed by Cadet de Gassicourt, who made it the subject of an inaugural dissertation. According to this chemist, 500 parts of jalap contain:

Resin	50.
Water	240.
Gummy extract	220.
Fecula	12.5
Albumen	12.5
Phosphate of lime	4.
Muriate of potash	8.1
Subcarbonate of lime, potash and iron	5.
Silex	2.7
Loss	17.
Total	500.

Journal de Pharmacie, 1817, *p.* 495.

The elder Henry, chief of the central Pharmacy of Paris, has also published a comparative analysis of light, heavy and worm-eaten jalap, merely giving the proportions of extract, resin, and residue. His results are as follows:

	Extract.	*Resin.*	*Residue.*
Sound jalap	140	48	210
Light jalap	75	60	270
Worm-eaten jalap	125	72	200

He infers from these experiments, that the larvæ which feed upon the jalap, eat only the amylaceous part, without attacking the resin, and the worm-eaten root is therefore to be preferred for the preparation of the resin.

The jalap which is sold in commerce is frequently adulterated. All the older books mention briony root as one of these adulterations, but I am not aware that it is now used for that purpose. The mechoacan, it is also stated, is frequently mixed with the true jalap, and may be known by the spongy texture and white colour of the internal part. I have seen parcels of root of this description, which I suppose must be the mechoacan. It is a dried tuber, larger than those of the jalap, externally of a smoky brown colour, and very much wrinkled, though not so minutely as the jalap.

It is also said by Bussy and Boutron Charlard, in their treatise on the falsification of drugs, that jalap is sometimes mixed with a substance which appears to be a species of agaric. It is in shapeless masses, weighing one or two ounces, light, strongly wrinkled, of a brown colour on the exterior, and internally of a rose colour, marbled with white, of a loose texture, and without much taste or smell. Divided in small fragments, and placed in contact with alcohol, the liquid acquires a deep yellow colour. The watery decoction is of a beautiful red colour, which most of the acids sensibly weaken.

A root has been recently brought to this market in considerable quantities, and sold under the name of jalap, which is evidently a spurious drug. It is a spindle-shaped root, full of strong thick fibres, arranged in concentric rings, and is transversely sliced in the same manner as jalap. The colour externally is a deep smoky brown, and the bark is much wrinkled longitudinally. The fracture is rough and uneven, of a gray colour, passing into a light reddish brown, and mottled or rather streaked with light ash-coloured waving lines, among which the strong, coarse, white fibres are conspicuous. I have not had an opportunity of comparing the chemical relations of this root with the jalap, any further than to observe that the precipitate formed in an aqueous infusion by sub-acetate of lead is copious, of a brownish green colour, while that by the same salt in an infusion of jalap is of a yellowish gray colour. The reader will perhaps be struck, in reading this description, with the resemblance of this root to that described in the following article, extracted from the Revue Medicale for September 1829.

MALE JALAP.—M. Chevallier read a letter to the Royal Society of Medicine, from M. Ledanois, a French apothecary travelling in Mexico, and dated from Orizava. M. L. announces a new kind of jalap, by the name of *male jalap*, which is found extensively in the country, and possesses strong purgative powers. He gives a short description of the plant which furnishes it; *it is very hairy*, and has *pale* leaves: that of the common jalap is smooth, of a bright green, and has a climbing stem. The male jalap presents fibrous, *spindle-shaped* roots, some twenty inches long, whilst the common jalap has tuberculous ones. M. L. proposes to ascertain whether this is a *convolvulus*, (for some botanists have made it an *ipomœa*), and if the male jalap differs from it, as a learned botanist thinks, only from the diversity of locality modifying its forms. M. L. gives the following analysis of the male jalap from experiments on 1000 parts.

Resin - - - - -	80
Gummy extract - - -	256
Starch - - - - -	32
Vegetable albumen - -	24
Woody fibre - - -	580
	972

The incinerated root presented muriates and carbonates of lime, of potass, and of magnesia, with some traces of iron and some other residua, trifling in quantity: this medicine besides is active and sure.

Observations on Seneca Oil. Read before the Philadelphia Chemical Society, 11 mo. 10th, 1829. By Samuel Allinson, Jun.

The article known in commerce by the name of seneka oil, though proximately a mineral, is most probably of ultimate vegetable origin. It exudes from soils reposing on beds of bituminous coal, and is found on the surface of springs and standing water in various places in the states of New York, Pennsylvania, Ohio and Virginia.

It is of a brownish black colour by reflected, and of a deep red, when clear, by transmitted light. Its consistence is about that of honey, and its sp. gr. 0.900; but this, as well as its consistence, varies.

From the property which it possesses of dissolving caoutchouc, and its general resemblance to Barbadoes tar, I expected to obtain naphtha from it by distillation, which, by being afforded at a reduced price, might prove of considerable utility in the arts. The article procured in this way, is, however, possessed of several peculiar properties.

It is transparent, colourless, and has the penetrating odour of seneca oil. Specific gravity at 60° Fahr. 0.800.

It is of an oily consistence, but is not inflammable unless very highly heated, though, like the fixed oils, it sustains the combustion of cotton, &c. The flame is then white.

It is perfectly soluble in ether and oil of turpentine, but insoluble in alcohol, ammoniated alcohol or water. Upon being agitated with water of ammonia, the mixture became milky; but after a short time the oil rose to the top, retaining a saponaceous appearance. By the addition of alcohol to the ethereal solution, the oil was separated and rose to the top.

It does not change the colour either of turmeric or litmus paper. As a solvent for caoutchouc, I found that five grains of the latter will make a thick varnish with ʒ ij. of the oil. The difficulty with which the oil is volatilized will be a barrier to its utility. Its boiling point is considerably above 212°, and my friend J. Carter, who distilled it for me, thinks it between 300° and 400°.

From the above account, it will be perceived, that this substance differs materially from any described by chemical writers. Naphtha, which it most resembles, boils at 186° Fahr. is readily inflamed by the approach of a lighted taper, and is soluble in alcohol.

Selected Articles.

Observations on Sarsaparilla and its preparations, with incidental remarks on certain other remedial agents in the cure of obstinate chronical disorders. By John Hancock, M.D. Fellow of the Medico-Botanical Society, Vice President of the Philosophical Society of British Guiana, Corresponding Member of the Zoological Society, &c.

[Concluded from page 304, Vol. I.]

The activity of sarsa as a medicine, seems to depend on a kind of narcotic quality, affecting the tongue and fauces with more or less of a nauseous acrimony,—the degree or intensity of which, affords the best indication of the strength and value of the drug. Its effects on one patient, an African, were certainly those of a narcotic, agreeably to the best definition of this term. It was given him in a large dose, the infusion from 4 oz. of Rio Negro sarsa. It caused nausea and great prostration of strength, a degree of torpor which induced him to lie upon the ground with unwillingness to move or to get up. He said that it made him "sick as death, and broke all his bones." There was scarcely any alteration in the pulse, unless it were a little retarded.

Whatever restorative and aphrodisiac virtues may have been by the ancients attributed to the Ophrys *Satyrion*, or the different Orchideæ, it appears to me, that the sarsa is the only medicinal agent justly entitled to the character of a direct restorative. This property, at the same time, seems to be totally unconnected with, or independent of, its farina or amylaceous principle, since it is found to produce the same restorative effects, not only when prepared by an aqueous menstruum, but also in a saturated alcoholic tincture, which we know could not take up those amylaceous or simply nutritive particles.

This is one of the most remarkable effects of the genuine sarsa, and tends clearly to exemplify its eminently salutary properties, namely, the augmentation of flesh, and melioration of the habit, so frequently observable in patients who have taken it for some time. It was noticed by many of the planters of Demerara, as well as by eminent medical practitioners, that not only did sores heal up, and swellings of the joints subside, on the use of the sarsa*, but that the patients acquired a plumpness, smoothness of the skin, and a degree of activity unknown before.

Whatever be its mode of action, its advantages will doubtless be found very great in the treatment of phthisis and scrofula, and especially in correcting a constitutional diathesis tending to those disorders.

It is esteemed by the colonial Spaniards as a remedy for every stage of syphilis. When they go under a course of this remedy, they drink barley water, vegetable acids, and cooling articles, to counteract the heating effects of the sarsa, for they consider it very heating. Perhaps they should ascribe this effect more to the vinous menstruum which they employ.

Much has been said by different writers regarding the *specific* powers, so termed, of sarsaparilla, as a remedy in lues venerea. Although well convinced of the great efficacy of the genuine sarsa, under proper regimen, in the various stages of lues, I consider it no specific ; and it is not particularly as an antivenereal remedy that I would insist on its value, but as a general corrective and sanative agent in scrofulous swellings, ulceration, and lesions of various kinds, and especially in general marasmus, cachexia, debilitated and emaciated habits, and in disorders arising from the abuse of mercury.

---

* It was proved by numerous examples, that the sarsa was the only efficient article in the preparation, and equally successful by itself, whilst the other woods, &c. usually joined with it, were productive of little or no perceptible effects on the patient or the disease. The bark of guaiacum, however, was an exception ; but not being an article pertaining to commerce or found in the shops, it was seldom obtainable. Certain native plants were also found exceedingly useful in healing ulcers, and as general alteratives ; but these are scarcely relevant here, and are intended to form the subject of a separate paper.

Those narrow views and vain discussions about the specific action of sarsa in syphilis, have had the effect of keeping down its character, as a great and extensively useful remedy—a character which it certainly deserves. It is to the want of a proper regimen under its use, to the introduction of spurious kinds, and to faulty modes of preparing it, (by long boiling especially), that we are to attribute the frequent failures which many complain of, and for which it is even totally neglected by some practitioners.

The disease, however, which in the Orinoko and Venezuela, most frequently demands the employment of this invaluable alterative, is a species of rheumatism, which commonly follows gonorrhœa, making its attack soon after the discharge has been suddenly stopped, and the patient has been exposed to cold and moisture.

This species of rheumatism, from suppressed gonorrhœa, is so common an occurrence in Venezuela, that it usually takes the name of *galico*, (*i. e.* venereal); and as most rheumatic affections are there referred to this cause, we rarely hear it spoken of under any other title.

The true gonorrhœal rheumatism, however, makes its attack upon the muscles, the ligaments, and even the periosteum of the bones, soon after the discharge disappears. The joints are rendered immovable; all the limbs, the spine, hips, and shoulders, suffer excruciating pain; after a time, these symptoms are followed by *tophi* upon the tibia, os frontis and bones of the fore arm, and the patient, if not timely relieved, becomes quite crippled and emaciated.

Whatever obloquy may arise from an avowal of our own misfortunes, the paramount objects of truth and candour compel me to say, that such as just described was *my own* case during several months of the year 1814; and that, after a full, but ineffectual trial of mercury, and the usual European remedies, I was entirely restored to health, by taking a single *botejuela* or small jug of the *Jarave del Rey.*

Having been long a convert to some of the exploded or unfashionable doctrines of the humoral pathology, it may readily be believed, that my faith was not diminished by considering the striking translations of disease, from one part to another, so apparent in the foregoing, and in numerous other cases equally convincing.

They also satisfy me, that, in certain cases at least, and these more frequent than is commonly imagined, secondary symptoms follow gonorrhœa as well as syphilis; and, when added to the observations of the army surgeons, (as to gonorrhœa producing chancre, and chancre gonorrhœa), they tend to establish the identity of these diseases.

The Spaniards, I may observe, by the term *reumatismo,* seem to mean nothing more than a flow or prevalence of acrimonious humours in the body,—the same as appears to have been understood by the Greeks in their ρευματιζω or rhĕumátizō,—afflicted with humours—"rheumatismes Græci fluxiones vocant."—*Plin.*

There is a scrofuloid species of ulcer which more frequently infests the negroes; appearing in different parts of the body, but more especially about the lower extremities, arising with a whitish head, remaining stationary for a long time, and when opened, mostly found to contain a curdy matter. In its rise, progress, and structure, it has a close analogy with tubercles of the lungs. It is of a most intractable nature; and usually requires, as a preliminary, the application of a strong escharotic. There are varieties of this ulcer; some of which, on being opened, show plainly the hidatid form, or half-organized structure; in different stages, *steatomatous, curdy, purulent,* &c.: they are encysted, and are doubtless animalcules. In their more perfect state, plano-convex, or shape of a coffee seed, marked with a sort of umbilicus, or black dot, on the flat side. Some of the old women in Demerara show a surprising degree of patience in picking out these troublesome subjects, to which they give the name of tetter ring-worms.

Mercurial salivations may cause these ulcerous tumours or tubercles to heal, but they soon break out again, without the timely use of sarsa, which is almost the only remedy we know of that will heal them with any degree of permanence; and of this we usually find a long course is required. The nitric acid and antimonials were found greatly to contribute to the sanative process; and not only in this species, but in most other inveterate ulcerations so common in the colonies.

It was in the course of my practice in those anomalous and inveterate complaints, that I perceived the absolute necessity of attending to the doses of medicines in a degree too rarely noticed and too little insisted on by medical writers. I especially allude to the necessity of watching the results and augmenting the doses of the remedies till some sensible effects are produced on the system. When that is sufficiently apparent, the remedy, whether it cause inconvenience to the patient or not, is of course to be discontinued for a time,—a week or two, and sometimes longer, according to the intensity of its action on the patient. When its apparent effects have subsided, we may again commence its use in a small dose, and augment it gradually as before.

By reflecting on the controul thus acquired over external ulceration, it naturally occurred to me, that the same method ought to have its influence in some cases of pulmonary lesions with severe cough and purulent expectoration, as also in ulceration of the bladder and other viscera.

It is true I had but few opportunities of repeating experiments proper for illustrating this important point, having left the colony not long after I had formed the plan here alluded to. My experience in this, however, was such as to afford me the most confident hope of its ultimate success in phthisis and internal ulceration.

In other cases likewise of obstinate chronic and cutaneous disorders, it is not unfrequently found requisite, especially amongst the negroes, to employ various additional remedies. A preliminary light course of mercury and antimony, nitric acid, iodine, sulphureous fumigation, a grain of opium at night, and the vapour bath occasionally, are amongst the best auxiliaries. The disorders here alluded to are, for the most part, of that anomalous description, which it would be impossible to characterize by any definite name as being chiefly complications of yaws, leprosy, syphilis, and scrofula, developed in various lesions or affections of the skin, joints, ligaments, and glandular parts, as cutaneous eruptions, swellings, ulcers, &c. in different parts of the body*.

---

* Amongst the chief exciting causes of such affections, we should mention exposures to vicissitudes of weather, in the rainy season especially, and defective nourishment. The latter cause, however, is not so frequent amongst the slaves, as they are usually well fed by their masters, whose interest, humanity apart, is too deeply involved to allow this point to be neglected; and, in case of deficiency, it would be speedily corrected by the interference of the law, which, in one of the richest soils conceivable, renders it compulsory on the planter to keep in proper cultivation, for every five slaves an acre of land, which, admitting the statement of Baron Humboldt to be correct, would be a supply for many times that number of people. See his *History of New Spain*, *Vol. II. p.* 374, where it is said, that "the produce of the banana is to that of wheat as 133 to 1, and to that of potatoes as 44 to one."

Without recurring to any exaggerated reports, and although never an advocate for slavery, I may here take occasion to remark, that the present condition of the slaves in the British *Continental* colonies (I do not allude to the Islands) may, in point of comfort and plentiful supply of food, be said to be quite enviable compared with that of the labouring classes in this country. This is a truth which ought in fairness to be stated, but it is not intended as an apology for slavery.

And this advertence, which may seem irrelevant here, I have introduced, because, upon speaking on these subjects in London, it has been more than once suggested to me, as a query, whether the negroes were not *half starved* in the colonies. A person of very moderate capacity like myself, after a residence of twenty-five years in the colonies, ought to be able to form a tolerably correct opinion on the subject.

The plantain is considered the staple and indispensable article of food in Guiana; but, independent of this, the slaves are generally allowed as much land as they choose to cultivate; consequently, those who are inclined to a little industry can procure, for their own use and for market, an abundance of yams, maize, sweet potatoes, and other nutritive vegetables. They are frequently found, however, to be very indifferent to this privilege, and, therefore, the supply of those articles, in order to ensure its being more constant and regular for their families, is, on certain estates, under the express direction of the proprietor or manager. I mention this beneficial practice, not as one universally followed, but as deserving imitation by all; for it is well known that a diversity of similar alimentary substances contribute much more strength and vigour than can be derived from any one taken singly, as, in respect to medicines and spices, their powers are greatly enhanced by combination.

I ought to observe here, that from the few trials I made with iodine, it appeared to be a very useful auxiliary in leprosy, and in those scrofuloid ulcers here spoken of, as also in swellings of the knee joint, common in Guiana, being a species of hydarthrus, or white swelling, arising as the results of cold and rheumatism, in strumous habits especially*. In lepra, the use of iodine was suggested, by the presence of those glandular lumps or tubercles, which, in all advanced cases, might be felt under the skin, especially in the legs and thighs of lepers, and withal greatly disfiguring the face. This remedy was exhibited in small doses, cautiously augmented, in the form of tincture, in the manner advised by *Coindet*, in somewhat analogous disorders of the glandular system; and also, as a deobstruent tonic, in cachexia or anasarcous habits, depending on glandular visceral obstructions.

The advantages gained by these remedies were often very great; they seemed to impart to the system a susceptibility to the action of sarsaparilla, and the bark of guaiacum. In one case of chronic hepatitis, the symptoms were quite removed by the use of iodine and sarsa, or *on* their use, for it is not always easy, when a recovery takes place, to decide how much is respectively due to nature, and how much to the remedy administered. Another instance may be adduced, in which an inveterate cough attended, and which gave reason to suspect the existence of tubercles in the lungs: the patient recovered after a six weeks' course of iodine and sarsa. In some other cases of this kind also, the result seemed to afford a hope, that the action of iodine, may equally contribute towards resolving the pulmonary tubercle, as well as those seated more superficially.

---

* When the joint was found much enlarged, the contained fluid was let out with a common lancet. This fluid was usually of a slimy or gelatinous nature, not unfrequently similar in appearance to that of the bursæ mucosæ in a healthy state, and more rarely sanious or purulent. I never observed any ill effects from these openings, or from the ingress of air which has been so much dreaded: indeed, the neglect of it must inevitably cause a stiff joint, or render amputation necessary. I may possibly labour under some erroneous impression, but I have long regarded that as one of the most preposterous of pathological dogmas which proscribes the timely opening of these tumours. It has probably arisen from several different tumours of the knee joint being confounded under the same name or names. Instead of discharging their contents by one of the simplest and safest operations, it is usually enjoined, that they be allowed to break of themselves: the consequence is, that the matter or fluid being pent up for a long time, makes its way in different directions under the muscular expansions, forming sinuses, corroding the capsular ligament and the ends of the bones, and, at the least, leaving the patient with an incurable anchylosis. It is, in general, only necessary to let out the fluid and bind the knee moderately tight with an elastic bandage. In cases where adhesion has not followed, and the collection and swelling has returned, I have injected into the sac a very dilute mixture of honey and water, and again pressed it out as soon as a little pain was excited, and which, with the internal remedies just mentioned, have effected the cure.

The genuine sarsa of the Rio Negro proves also a very potent antihydropic, especially in cases of great debility, and where dropsy arises in emaciated habits. The diuretic power of the carony bark has been already alluded to, (see p. 26 and 27). It is, perhaps, partly owing to this power, and partly to its tonic and bracing effects, that this bark has been found so useful in dropsies, in which it has often proved a decisive remedy; and, at other times, a powerful auxiliary, along with a gentle course of mercury and squills, with the use of taraxacum, and a grain of opium at night, and once or twice a week a dose of the wild elaterium, or bitter cucumber, MOMORDICA *operculata**, in a solution of tartrate of potash. This is briefly the plan which, in general, I have found most successful in dropsies of various kinds, whether general or partial.

I must here observe, that in recent dropsies which come on suddenly from colds and obstructions, we find depletion to be of the first importance, the *sine qua non* indeed. In this species of dropsy, the blood is often observed to be sizy or quite gelatinous. The remedies just mentioned usually produce a degree of tone and excitement in the system, such indeed, at times, as to indicate bleeding. This condition, arising in adynamical dropsies, in chachectic and leuco-phlegmatic habits, is ever to be regarded as the most favourable; and, under such circumstances too, moderate depletion has been found most essentially to promote the curative process, and to contribute to a happy recovery. The diseased action seems by these measures to be subverted, the dormant energies of the vital or nervous system to be roused into action; the vessels to recover their wonted power of contracting upon the sluggish fluids, of propelling them through the veins and capillaries, and of restoring the healthy balance throughout all the corporeal functions.

---

* This plant grows abundantly on the coast of Essequebo, especially at Cape Batave, the property of Mr Gilgeous, and at Plantation Richmond, belonging to Mr Bean.

The results of such cases tend to convince us, that remedial agents which we are prone to regard as the most opposite and incompatible, not unfrequently prove the only curative ones in many of the most untoward disorders, and those too, both acute and chronic, for similar conclusions may likewise be drawn from those methods which have been found to be the most successful in cases of yellow fever.

It is well known there are a great variety of exceedingly useful remedies amongst the indigenous vegetables in England, but these, in general, appear to be too much neglected by the members of the faculty, who, however eminent in other respects for exalted talents and profound medical skill, seem, on the whole, to evince rather too exclusive a preference to the chemical or chemico-mineral remedies at present in vogue. Amongst those native plants I should venture to propose the taraxacum, or dandelion, as a valuable addition to this compound infusion of sarsaparilla (p. 68). This plant, the taraxacum, is acknowledged to be a useful remedy in certain obstructions and disorders of the liver, by some eminent English physicians; and on the continent, in Germany especially, it is employed with the most decided advantage as an alterative in cutaneous affections, and many very obstinate chronic maladies, as I have been assured by earl Stanhope, the distinguished president of the Medico-Botanical Society, who, to the more renowned and splendid talents of a statesman, as a peer of the realm, unites a love of all the sciences conducive to human happiness; attaching however a more particular interest to the advancement of medical botany, on which subject he has manifested the most correct views and soundest intelligence: he is moreover sensibly impressed with a conviction that, in the prevalent affectation for mere descriptive botany, its more important and scientific objects have been nearly overlooked and disregarded, viz. the application of its principles to useful purposes in medicine, in the arts, and to domestic comforts and economy.

His lordship being absent (on the continent) I have used this reference without permission, persuaded, however, that he would not refuse his name to a discussion which involves the public good, and the objects of the Medico-Botanical Society.

Memoir upon Fecula. By M. Guibourt.

[Concluded from Page 214, Vol. I.]

Fecula from Wheat.

Examined by the microscope, this fecula appears in spherical globules of a very variable size, but always of a smaller volume than that obtained from the potato.

The hardness and adhesiveness of the starch of commerce is owing to the escape of the gelatinous matter when bruised in a mill, or by the heat of fermentation; whilst that of the potato remains pulverulent.

M. Raspail observes, it is therefore preferable to use this soluble part of wheat fecula cold, to stiffen linen, but that in impregnating the fabric with the potato starch, and retaining it sufficiently moist, it has been proved that the head of the iron passing over it, whilst it assists the solution of its soluble matter, will absolutely produce the same effect as in the former instance.

It is not, however, to this application that M. Guibourt believes the utility of fecula may be limited, but that the facility of effecting a solution without heat, by simple bruising it, will give rise to its employment in place of gum, in many of the arts where there is now a great consumption of that exotie substance; already have attempts been made thus to use it by torrefaction, but the colour and odour imparted to the product by this process would injure it in most cases for such an application.

Arrow Root.

The arrow root, fecula from the *maranta indica,* is in grains of a larger size than that of wheat, more shining, and entirely transparent when exhibited through a magnifying glass. It is its great transparency which diminishes the whiteness of its powder. Examined through a microscope, the grains appear spherical, oval, and sometimes triangular, like those of the fecula of the potato; but they are always less in size. Both communicate to boiling water less consistence than starch; which may arise either from their containing more water, (a fact contested by M. Theodore de Saussure, with regard to that of the potato), or they may contain a greater proportion of soluble fecula, which last circumstance is the probable cause.

Moussache and Tapioca.

These two feculæ are extracted from the root of the *jatropha manihot,* and differ only in the manner in which they are dried. The first in the open air, and the second upon heated plates of iron, which give the form of irregular lumps, composed of agglomerated grains of fecula. The moussache was but little known in France, until it was recently sent from Martinique, as a substitute for Jamaica arrow root; and it appears that there has already been a large quantity of it consumed under the latter name. It is difficult to distinguish it by the eye; but to the microscope it presents a granular form, spherical, much smaller than the arrow root, and less also than the large grains of starch, and *an uniformity of size* that is remarkable. This last character will prevent the moussache from being confounded with any other fecula. Tapioca is in very hard and slightly elastic lumps, which appear through a magnifying glass, formed of spherical agglomerations of transparent grains of fecula. These grains have been in great part burst open by heat.

Tapioca, swollen and diluted in water, furnishes a solution of fecula that changes to a deep blue by the addition of iodine.

It is not entirely soluble in cold water, as has been asserted by one of my predecessors; with boiling water it forms a peculiarly transparent and viscous starch; submitted to a protracted ebullition in a large quantity of water, it leaves an insoluble residue, that readily precipitates. This residuum, mixed in water and coloured by iodine, to render it more distinct to the microscope, presents a mucous flocculent form, which bears no resemblance to the primitive teguments, and which floats in the midst of a colourless liquid.

Sago.

Sago is the fecula of the *sagus farinaria.* Such as we receive is in small rounded grains, very hard, and of a dull white or reddish tint, demi-transparent.

This fecula appears so very dry, that one would suppose it ligneous, if the microscope did not show that it is entirely composed of amylaceous grains, like those of the potato, distinct, but oftentimes matted or variously pressed together. Scarcely any of it is soluble in cold water, and iodine imparts to its filtered solution only a violet tint. Heat bursts the grains, and leaves the teguments exposed, which are of all others the most insoluble, and longest resist the action of boiling water; for however protracted the ebullition, or however great the quantity of water, there still remains an insoluble residuum, easily separated by repose; and which, when tinged with iodine, and examined through a microscope, appears to have preserved the isolated form of the grains of fecula. It is generally admitted that sago owes its reddish shade of colour to a slight torrefaction; but the entireness of the grains show that the heat employed must have been trifling; and M. Guibourt is rather disposed to attribute this partial coloration to a foreign principle, not entirely washed from it, and which, contributing to unite the grains of fecula, is the cause of their semi-transparency.

Salop.

This is not the proper place to describe salop, which is the root of the *orchis*, steeped in boiling water and dried, and not a fecula. Besides, this substance, such as it is found in commerce, has been thoroughly examined and described in the memoir of M. Caventou, (Ann. Chim. Phys. xxxi. 345). M. Guibourt believes, however, that to obtain a just idea of its composition, one ought to examine the recent or dried root, previous to immersion in boiling water; for this operation, by bursting the grains of starch, impregnates with it the texture of the bulb, or the substance analogous to bassorine, which constitutes the greater part of this root, and communicates to them the property of tinging blue by the addition of iodine, in the same manner as starch; which has induced the belief that salop is much more amylaceous, than it really is.

Note upon Amadine.

M. Theodore de Saussure has given this name to one of the products, from the spontaneous alteration that occurs in starch. M. Raspail believes, that this is nothing else than the teguments which have escaped decomposition. And M. Caventou's *amadine* corresponds with our soluble fecula.

These apparent differences of opinion, M. Guibourt thinks may be easily reconciled.

He concludes with stating:

1. That starch contains the teguments of fecula, simply swollen, and not dissolved, since it is a necessary condition of its consistence.

2. That these teguments which are insoluble in cold water, when once partially dissolved by ebullition, furnish a liquor, which offers all the characteristics of soluble fecula, properties which are exactly those of the amadine of M. de Saussure.

He is convinced therefore with M. Raspail, that M. de Saussure has extracted this substance from a part of the teguments which has escaped spontaneous decomposition; and with M. Caventou, that this amadine is nothing more than soluble fecula. C. E.

Observations on the Orayuri or Angustura Bark Tree. By John Hancock, M.D. Fellow of the Medico-Botanical Society[*]. *Read July the 11th,* 1828.

The powerful medicinal properties of the Angustura Bark, and its great efficacy in many cases, acknowledged by all the learned practitioners of Europe for more than thirty years, will, I trust, prove a sufficient apology for my drawing the attention of the Medico-Botanical Society to the Tree from which this drug is obtained.

Having travelled repeatedly, and resided during several months (particularly during August and September 1816) in the missions of Carony, and sketched a map of the district, I had an opportunity of seeing many thousands of the Bark Trees, and of examining numerous specimens on the spot, deeming it, as a medical practitioner, a duty incumbent on me to improve the opportunity which then offered, of making myself thoroughly acquainted with its botanical characters, well knowing how imperfectly they had been described in the different works then extant. In the course of my observations, I remarked that it would have been impossible for any botanist, however expert, to recognize the Angustura Bark Tree with the assistance of any one of those works, into which its descriptions have all been transcribed from that of Baron Alexander de Humboldt and his scientific coadjutor, M. Aimé Bonpland; and I have no doubt that those learned gentlemen themselves will confess, should these pages ever reach them, that they have fallen into an error by trusting too much to the testimony of others. I was informed by MM. Ravigo and Jose Terreas, with whom the travellers lodged at Angustura, that they did not visit the missions of Carony, but sent an Indian, who returned with a sample (*muestra*) of the leaves, but, much to their disappointment, without flowers. It is therefore probable that their descriptions refer chiefly to specimens which

---

[*] The Society's Gold Medal for 1829 was awarded to the author for this paper.

they observed in the province of Cumana, where *a species* of the Genus to which the Angustura Bark Tree appertains may grow to the size mentioned.

I shall now endeavour to lay before the Society, in as concise a manner as possible, the results of my observations on the external appearance of the plant; the prominent differences between my description and that of Humboldt and Bonpland in their splendid work on the Æquinoxial plants; and, lastly, the medicinal properties I have noticed in the Bark, together with the manner in which I have administered it.

I was never enabled to learn from what source the illustrious travellers above mentioned derived the name *Cuspare* for the Carony Bark Tree. I resided for three years and a half at St Thomas de Angustura in Spanish Guiana, whence I made several excursions amongst the missions of Carony, and the tracts inhabited by Indian tribes between them and the mountains of Parime, but never once heard the term used; the vernacular name among the Aborigines of this part of Guiana (the tribe called Guyanos, who had long been subject to the dominion of the Catalonian Capuchin Friars) being *Orayuri;* and among the Spaniards and Creoles, it was known by the name of *Cascarilla* or *Quina de Carony*. The *Cuspa*, however, which is known as a tree of Cumana, has a bark that is bitter, and of a yellow tint; and although it is much lighter, nauseous to the taste, and altogether different from the Orayuri, it is fancied by the inhabitants of Cumana to be allied to the Carony Bark Tree; at the same time they acknowledge its virtues to be much inferior. They usually judge of plants only from some similitude in the bark, leaves, fruit, &c. without regarding the flowers. So, also, in Demerara, some have identified the Carony Bark Tree with the *Yaroury* or Paddle Wood, than which, scarcely any two trees differ more, with the exception of a likeness in their barks, both having a yellowish colour and bitterish taste.

It is not in Carony or Guiana then, but doubtless in Cumana, that we are to seek the derivation of the term *Cuspare*, an easy transition from the *Caspa* of the natives, which is probably of Tamanac origin. I know their great fertility of invention when in want of a name for any thing met with in the forest; though I have observed that, among some of the Indian tribes, we find, notwithstanding the numerous confusions they make in many instances, a remarkable degree of intelligence and aptitude in naming trees and plants according to their natural affinities, especially amongst the Arowak tribes: *Wayure* is equivalent to our Orchideæ; *Sirua* to the Laurineæ, and hence come *Sirubali* (OCOTEA *Cymbarum*), *Sirudani*, &c. by adding various adjective terms indicative of the different species.

As to the Cuspa Tree, with which the Orayuri may have been thus mistaken, I cannot here speak with sufficient accuracy; for having sent from Demerara in 1825, requesting complete specimens, bark and all, of the Cuspa Tree of Cumana, I received the following year a few pieces of the bark, with the important information, or what, no doubt, was thought important, that the leaves and flowers were not used "*como remedios.*"

The Angustura Bark Tree grows in abundance on the mountains in the neighbourhood of St Joaquin de Carony, situated between the 7th and 8th degrees of northern latitude. It is also well known in the missions of Tumeremo, Uri, Alta Gracia, and Cupapui, (as correctly mentioned by Humboldt), which are the southern and back missions of the Orinoko, at a distance of upwards of 200 miles from the sea. It lines the road side, in many places, between the missions of St Antoni and Villa Upatu. It delights in a rich soil, and flourishes at the height of between 600 and 1000 feet above the level of the sea.

It seldom or never exceeds the altitude of 20 feet, the usual medium being about 12 or 15 feet. The diameter of the trunk, which is tolerably erect, is from 3 to 5 inches.

Branches scattered over the whole tree without much order.

Bark, smooth and externally gray.

Leaves, placed, for the most part, alternately on the branches, composed of three folioles, supported on a common petiole of nearly the same length as the leaflets, slightly channelled on the interior surface. Leaflets oblong, in general from 6 to 10 inches in length, and 2 to 4 in breadth, the centre one being longer than the lateral ones, pointed at both extremities, and connected at the base by very short leaf stalks with the common petiole. They are very smooth and glossy, of a vivid green, and yield, when recently broken from the tree, a strong odour, greatly resembling that of Tobacco, from which circumstance the term *Orayuri* seems derived, as the word *Yuri* or *Yourie* signifies Tobacco in the Arowak dialect. Some of the leaflets are marked with small, whitish, round spots.

Flowers, numerous, borne towards the extreme part of long spikes or racemes, which are both terminal and axillary. Bracteæ, lanceolate, acute, in pairs. The flowers also have a peculiar, not the most pleasant, odour.

Calyx, monopetalous, bell-shaped, five cleft, hairy, rough, inferior, and persistent; green, about one-fourth of the length of the Corolla.

Corolla, somewhat curved prior to expansion, tubular, bursting from the centre; nearly an inch long; tomentose both inside and out; composed of five unequal petals, two of them being about 1-9th longer and larger than the others, so united at the base as to appear inseparable*, and indeed never separating; these petals are reflex, oblong, obtuse, fixed in the receptacle, and, when faded, breaking off round the germ, leaving a protecting border besides the receptacle.

Nectaria, if they may be called so, five linear leaflets borne at the mouth of the tube, half the length of the petals, each bearing at its summit a very minute, round, pellucid glandule, filled with a fluid.

Stamina, two. Before the expansion of the flower they are found lying towards the inner or inflected side of the corolla, the anthers in the groove of the two longer petals, the tips of the three shorter ones being incurved over them as for protection. Filaments flat, inserted into the two longer petals at the mouth of the tube, considerably shorter than the nectaria. Anthers large, linear, erect, longer than the filaments, four channelled, two celled.

---

* I had previously described the Corolla as monopetalous, and I still consider it to be so, although, in submission to higher authorities, I have in the text spoken of it as a pentapetolus Corolla.

Pistillum, consists of a five-lobed depressed germ, immersed within a coriaceous receptacle ; a simple, filiform style, hairy at the middle, longer than the tube, and a capitate entire stigma.

Pericarp, consists of 5 bivalve capsules, of which 2 or 3 are commonly abortive, resembling short legumes, gibbous. When in the embryo state they are smooth, tender, and semi-pellucid, and when approaching maturity, they gradually acquire a villous rough coat.

Seeds, two to a capsule; one of them often abortive, round, black, the size of a small pea, fastened near together by minute pedicles within a chaffy envelope, which is again surrounded by a strong elastic perisperm or arillus, which is horny, bivalve, bursting with violence, and dispersing the seeds it contains to a considerable distance.

Of the *receptacle*, or that part which may be designated thus: In the early stage of the flower, when the corolla has reached the length of 3 or 4 lines, on detaching it from the calyx the 5 little ovaries may be observed standing naked upon the receptacle, which is then merely such. It, however, gradually grows up into a rim or circle around the ovaries in such a manner, indeed, as entirely to cover and envelope them in a tough leathery coat or hood. By the time the flower is ready to open, and at the falling off of the Corolla, it entirely conceals them. When they commence to emerge, this receptacle dilates, thickens, and remains a supporting base to the then super-imposed capsules. When the flower is fully opened, the receptacle is obscurely 8 or 10 notched. May not these different evolutions be compared to the metamorphoses of insects, or rather to the changes which take place between the chorion and embryo in animals, during the earlier periods of gestation?

The Angustura Bark Tree flowers in vast profusion during the months of August and September, when its elegant, white blossoms add greatly to the beauty of the scenery. Its seeds ripen in October and November.

I shall now proceed to notice the differences existing between the foregoing description and those of anterior and even subsequent writers, such as:—Willdenow, who erroneously formed a new Genus, which he called Bonplandia, on the plant sent him by Baron Humboldt as the one in question, notwithstanding there already existed a Genus of that name, and although the Angustura Bark Tree most obviously belonged to the Genus Galipea of Aublet*:—Humboldt, and subsequently

---

* In the above opinion, formed in the year 1816, I am confirmed by the following extract from the *Prodromus Systematis Naturalis Regni Vegetabilis* of De Candolle, (vol. i, p. 730,) a work which I have been enabled to consult only since my recent return to England, and to which, after I had nearly completed this paper from the numerous observations I had made 12 years ago, my attention was directed by Mr Yosy, Sec. Med. Bot. Soc., who, having mentioned the subject to Mr David Don, the learned Librarian of the Linnæan Society, was by him informed of the improved arrangement made by De Candolle.

"DICOTYLEDONES seu EXOGENÆ.

"RUTACEÆ.

"Trib. II. Cuspariæ. D.C.

"XXIV. Monnieria.

"XXV. Ticorea.

"XXVI. Galipea. *Aubl. Guian.* 2. p. 662. *St. Hil. Bull. Philom.* 1823, p. 131. Galipea et Cusparia, *D. C. Mem. Mus.* 9, 142 et 148. Cusparia, *Humb.* Bonplandia, *Willd. non Cav.* Angustura, *Ræm. et Shcultz.* Conchocarpus, *Mik.* Obentonia, *Vel.*

"Calyx brevis quinquedentatus. Petala quinque in corollam hypocrateriformen coalita, seu valde approximata, tubo brevi pentagono, lobis patentibus acutis. Stamina 4-7 hypogyna, petalis subadhærentia, inæqualia, interdum omnia fertilia, sæpius 2 majora antherifera, 2-5 breviora sterilia. Nect. cupuliforme. Styli 5 in unicum mox coaliti et stigma 4-5 sulcum constituentes. Carpella 5 aut abortu pauciora biovulata obtusa cocculiformia sessilia, endocarpio separabili. Semina abortu solitaria. Cotyledones magnæ corrugatæ biauriculatæ. Frutices glabri; folia alterna simplicia aut plurifoliolata, foliolis oblongis acuminatis; pedunculi axillares multiflori.

* *Foliis compositis.*

"1. G. *trifoliata.* (Aubl.)

"2. G. *Ossana.*

"3. G. *Lasiostemom.*

"4. G. *Cusparia* (St. Hil. MSS.) foliis 3 foliolatis, racemis pedunculatis subterminalibus, calyce 5 dentato, staminibus sterilibus 3. Hab. in Amer. merid.

Humboldt and Bonpland, who from the nomenclature adopted by the former in his *Tableau Géographique des Plantes*, passed over to that of Willdenow; and Messrs Rœmer and Schultz in their *Systema Vegetabilium*, vol. iv. p. 188, who have described the Genus under the name of ANGUSTURA, thereby giving an improper example to future botanists, as the nomenclature of plants should never be derived from the countries or particular places they inhabit.

And, *first*. We are informed in the *Plantæ Æquinoctiales*, by Rœmer and Schultz, and by Dr Thompson in his excellent London Dispensatory (a work which, from its more general circulation amongst medical men, and even amongst the public generally, ought above all others to be correct), that the tree yielding the bark in question, is a majestic forest tree from 60 to 80 feet high. As it would appear that M. de Humboldt never saw the Bark Tree at Carony, it is more than probable that the tree which he saw growing at Santa Fé de Cumana, and New Barcelona in New Andalusia, and which he considered to be the same as the one of which he had obtained the foliage, whilst residing at Angustura, is a distinct species of the same Genus.

Secondly. Not only does a similar variation of size exist between the leaves of the GALIPEA under consideration, and those of BONPLANDIA *trifoliata*, but the proportion in the length of the petiole, when compared to that of the leaflets,

---

Cusparia febrifuga, *Humb. tabl. geogr.* Bonplandia trifoliata, *Willd. act. acad. berol.* 1802, *p.* 24. *Humb. et Bonpl. pl. eq.* 2, *p.* 59, *t.* 57. *Kunth nov. Gen. am.* 6, *p.* 8. Angustura Cuspare, *Ræm. and Schult syst.* 4, *p.* 183. Cortex Angusturæ, *Offic.*

" 5. G. *heterophylla*, &c. &c."

I have to acknowledge my obligation for some of the hints above given, with regard to nomenclature, to De Candolle's paper on the Cuspariæ in the Mem. Mus. 9, p. 148, and to the learned work of Messrs Rœmer and Schultz.

It might be here remarked that *trifoliata* seems not to be a very appropriate specific distinction, since there are no less than four species of GALIPEA already known as *three-leaved*. Besides which, the *three-leaved* SCIURIS or RAPUTIA of Aublet, of which I possess very perfect specimens, appears also to be a true species of this Genus. Aublet neglected to give a precise description of the fruit, which is similar in structure to that of Orayuri. I observe that M. de Candolle has, with some hesitation, still given it a distinct Genus.

is totally different, the leaves of the B. being stated to be 2 feet long, and the petiole one or nearly so.

Thirdly. The leaves of Humboldt's tree are stated to exhale, when fresh, an agreeable odour, whereas those of *Orayuri*, when fresh gathered, yield an odour resembling that of tobacco, which, however tastes, in the general acceptation of the word, may differ, can scarcely be said to be agreeable.

Fourthly. The corolla is represented in the *Pl. Æquin.* as regular; and by Mr Kunth one petal is said to differ from the rest; whereas the corolla is irregular, there being two longer and three shorter petals.

Fifthly. The appendages which I had considered as nectaria, by others taken for abortive stamina, are invariably five in number, though stated by some as three (Rœmer), and by others as four (Kunth).

Sixthly. The stamina are said by Kunth to be monadelphous, whereas they are distinctly (separately) inserted in the two longer petals of the corolla. Their number is also greatly at variance with the truth, the *Plantæ Æquinoctiales* and most other works terming it a Pentandrous Plant. But it may be said that those linear leaflets, which I have considered as nectaria, have been reckoned amongst the stamina as being nearly concentric with them. This, we see, has been done, but it does not clear the difficulty, for these bodies are, in *Orayuri*, invariably *five* in number, and, having no anthers, ought not to be confounded with the stamina, whilst the proper filaments with large anthers pass at the same time totally unnoticed; but even supposing the numbers to correspond, these linear leaflets could never with propriety be regarded as stamina, as the anther is the essential part, and without the anther there is no stamen. If these are to be taken for stamens, then the plant is heptandrous. In the description given in the *Plantæ Æquinoctiales* there is, moreover, no mention of sterile stamens.

Seventhly. The seeds are represented as being solitary, whereas, though one of them is generally abortive, there are invariably two, or, at least in the case of abortion, the rudiments of a second.

In the *Orayuri*, I can find no trace of the spur at the bottom of the anthers mentioned by Humboldt.

The pistil of Bonplandia is said to have 5 stigmata, instead of a simply capitate one.

There are other minor discrepancies in the flower, but the most remarkable appearance in *Orayuri*, and which is not touched upon in the description of Bonplandia, is the uncommonly strong and horny arillus in which the seeds are enclosed. This appendage is so elastic that it is difficult to preserve the seeds, the capsule always bursting in the dried specimens. This species of perisperm or seed-envelope, where it obtains, so far from being disregarded, was considered by Linnæus as one of the essential characters of a Genus. Witness Dictamnus, Diosma, Coffea, &c., but in none is it so notable as in *Orayuri.*

Though concurring, on the whole, with the lucid arrangement of MM. Auguste de St Hilaire and De Candolle of the Genus Galipea, I cannot agree to the specific name bestowed by those eminent botanists on the Angustura Bark Tree, the term *Cusparia*, being, as I have before observed, founded in error. I shall, therefore, agreeably to the suggestion of my friend, Mr J. P. Yosy, one of the Society's Secretaries, propose the name of Galipea *officinalis;* with the following specific description:

Galipea *officinalis*, foliis 3 foliolatis, racemis pedunculatis axillaribus et terminalibus, calyce 5 dentato, staminibus 2, nectariis 5 (staminibus sterilibus ?)

If in the delightful and fruitful country to which this plant is indigenous, the heat is at times oppressive to the inhabitants, engendering malignant fevers, yet this salutary and providential antidote is growing at their doors, and they have acquired a tolerable knowledge of its powers, the mode of employment in that part being to drink a warm infusion in order to induce sweat and diuresis. They often, however, begin with so large a quantity as to evacuate the stomach or the bowels, for it is capable of effecting both, and indeed is often employed for that purpose as well as a febrifuge *(contra-calentura)*, while a decoction of the leaves is resorted to as a bath in fevers and pains of the limbs, arising from cold or chronic rheumatism.

In the years 1816 and 1817 there prevailed in the district of the Orinoko, and particularly at St Thomas de Angustura, a malignant bilious intermittent fever, which proved fatal to great numbers of the inhabitants as well as to foreigners. In the latter, it assumed the form, in many cases, of true yellow fever, with *vomito prieto*.

I had the appointment of *Medico de Sanidad* in the harbour, which is about 260 miles up the river, and had an opportunity of observing this disease in all its various shapes. I had also the care of the Military Hospital in 1817, during the absence of the garrison-surgeon, Don Pablo Gonzalez, and had seldom less than 60 or 70 patients with fever, dropsy, and dysentery. The number of hydropic patients was almost incredible. It was distressing to see them dying along the streets of Angustura from the effects of fever and want of food, the town being besieged by the patriot forces under General Bolivar.

In March 1817, the mortality increasing, our stock of Cinchona was soon expended, and we had no other resort but to the Quina de Carony, of which there was a large supply in the town. It was prepared nearly as prescribed by those who were there termed *Curiosos*, or the native doctors.

Into a large jug, containing about six gallons, we put one pound of coarsely-powdered bark, with an equal quantity of brown sugar, filled it nearly with boiling water, and added about four ounces of wheaten bread to hasten fermentation. It was then stopped close, placed in the sun, and shaken frequently. As soon as fermentation was well begun, it was considered fit for use, and administered in the quantity of from four to six ounces to the dose, three or four times a day.

The success of this seemingly odd preparation was very remarkable. The irregular paroxysms of fever were suspended on the second or third day after commencing its use. The number of deaths of patients from fever was soon diminished to one-fourth of that which before fell victims to this dreadful scourge; though prior to this time it was gradually on the increase. In the month preceding the adoption of the Cortex

Angusturæ, fifty-three persons died of fever: the month following, there were but fourteen, and several of these were in a dying state when they began to use the Bark.

I, at first, conceived that fermentation might injure the remedy, but had subsequently every reason to suppose, that the evolution of the carbonic acid rendered the remedy more energetic, and more grateful to the palate and the stomach. Besides this, the acetic acid and small portion of Alcohol generated in the fermentation would contribute to extricate more completely the active element of the bark, thus improving the remedy by augmenting the solvent powers of the menstruum.

It was not long before I perceived the efficacy of the fermented infusion in dropsy, for many of the fever patients were hydropic, and it was found that their swellings rapidly diminished on the use of the infusion. This naturally induced me to give the same remedy as a tonic to those patients who were simply dropsical or without fever. Its powers in those proved more striking and decided than any thing I ever witnessed before in medicine. No regular account of these, however, was kept, as it was administered to a great number of patients in and out of the hospital.

In the more severe cases of dysentery, the Dover's powder was given with each draught of the infusion, in doses of from five to ten grains, three or four times a day.

We had thus no reason to regret the exchange we had from necessity made, for the Angustura bark was found to be greatly superior to the Peruvian bark. Though some patients were averse to it at first, they soon requested to have it, when they saw their companions in sickness recovering so fast under its use. I afterwards received a supply of Cinchona from Trinidad, but made no use of it.

I have also witnessed the best effects from this remedy since my return to Demerara, although I could at that time seldom procure it in a fresh state, owing to the long cessation of intercourse with the Orinoko.

The Capuchin Friars of Carony had been in the habit of preparing an Extract from this Bark, from the sale of which they derived great pecuniary advantages, but from the trials I made with this it seems much inferior to the fresh bark or its recent infusion.

The natives also use the bruised Bark as a means for intoxicating fishes *(Barbasco)*, which affords a very singular coincidence with what is mentioned by Dr Saunders, of the same use being made of the Cinchona Bark by the Peruvian Indians.

I am fully convinced, from ample experience of the virtues of this Bark, that it is one of the most valuable febrifuges we possess, being adapted to the worst and most malignant bilious fevers, while the fevers in which Cinchona is chiefly administered are simple intermittents, for the most part unattended with danger.

May I be allowed to hope that, with the assistance of the above description, the GALIPEA *officinalis* may be found on the higher lands (continuation of the Carony mountains) near the falls of the rivers Demerary and Essequebo, and that the bark may be thence imported in a state much more fit for the London market than it is now to be had, coming as it does through a circuitous route, the length of which cannot but impair its properties.

I have thus endeavoured to lay before the Society the results of my observations, humble as they are, and hope that, though insignificant in themselves, they will lead to future investigations into the medicinal properties of this valuable remedy, which I am fully convinced are not to this time sufficiently known or appreciated.

On some Pharmaceutical Preparations of Iron, and particularly the Tartrates. By Andrew Ure, M.D. F.R.S. &c. &c.

1. Tartaric acid has hardly any action on the red oxide of iron, for though 200 grains of the former dissolved in water,

were digested on a sand bath on 50 grains of the latter, in the form of the rubigo ferri of the shops, it became but faintly coloured in the course of three days, and a very few grains only of the oxide were taken up. The same rust of iron was quite soluble in dilute muriatic acid.

When tartaric acid, in solution, is digested on red oxide of iron, prepared by nitric acid, no apparent combination ensues after many hours, and the re-crystallized acid is nearly colourless.

2. The readiest mode of obtaining a proper red tartrate of iron, is, by mixing the liquid red sulphate with solution of tartrate of potash in equivalent proportions. Sulphate of potash precipitates in a crystalline powder, (the solutions being somewhat concentrated) which may be separated from the blood-red liquid tartrate of iron by filtration. When to this ferreous solution, its own bulk of alcohol, sp. gr. 0.840, is added, so as to form a proof spirit menstruum, decomposition immediately ensues, indicated by a cloudiness, and a precipitate of a treacly consistence and aspect, which collects at the bottom. The supernatant liquid is nearly colourless, and contains hardly any iron, but much tartaric acid. The viscid precipitate soon hardens into a brittle mass of subtartrate of iron, insoluble in water. Thus it appears, that a spirituous menstruum is not at all adapted for holding red tartrate of iron in solution, though Madeira and Teneriffe wines of common strength answer very well.

When the above concrete precipitate is treated with water, acidulated with tartaric acid, it readily dissolves, with the reproduction of red tartrate of iron.

The subtartrate, when newly thrown down, is fusible at the heat of 180° or 190° F. It burns reluctantly in the flame of a spirit-lamp, with a faint ignition, and a slight smell of caromel.

3. The potash-tartrate of iron, as prepared by the process of the London Pharmacopœia, is a powder of an olive-green colour, occasionally tinged with brown. When 100 grains of it were heated to the temperature of 160° F. they lost 4 grains; but this loss will vary according to the manner of preparing it.

By dull ignition, in a platinum crucible, it emits a lambent blue flame, and is converted into red oxide of iron and carbonate of potash, amounting together to 52 grains. The alkali was dissolved out with water, and tested with acid. It indicated 16 grains of potash, equivalent to 46.5 of tartrate of potash. The peroxide of iron weighed 32 grains. This existed in the original compound, partly as a tartrate, and partly as a subtartrate; for not more than two-thirds of the original powder are soluble in water.

If one volume of the solution of the potash-tartrate (in about seven times its weight of water) be mixed with one volume of alcohol, sp. gr. 0.840, so as to form a proof-spirit menstruum, the subtartrate of red oxide of iron immediately forms, and falls in a viscid mass, and the spirituous liquid becomes nearly colourless, containing very little iron.

Though the spirituous vehicle, prescribed in the Pharmacopœia, be weaker than proof, there can be no doubt from the above experiments, that a dilute alcohol is not nearly so proper a menstruum for this triple salt of iron as Madeira wine, which, containing a considerable portion of acid, will form a more powerful and permanent solution.

4. Medical men have, in modern times, probably paid too little attention to the state of oxidizement in which they administer iron. The older chemical physicians of the celebrated school of Stahl, taught, and I believe justly, that according as this metal is differently prepared, it acquires powers over the body of a different, and almost opposite, nature. Some preparations were said to promote the motion of the fluids through the whole system; while others repressed or obstructed these motions. The remarkable stimulant and deobstruent virtue displayed by iron in the cure of chlorosis, was, at that period, attributed to one of its supposed constituents, the *phlogiston*; as the astringent property was referred to the *earthy* ingredient. When these notions, derived from "old experience," are expressed in modern phraseology, we may say, that the mildly exciting power of iron will be found in its metallic or protoxide state; while its acrid and constringing qualities may be sought for in its peroxide, and in certain

saline compounds, where the acid contributes its share of the effect, as is the case with the sulphate.

In fact, it may be affirmed, that iron, like copper and mercury, acquires acrimony (pathologically speaking) by peroxidizement; a conclusion which would have been more generally drawn, had a good form of protoxide preparation existed in our Pharmacopœias, or our shops. The *precipitated subcarbonate of iron* is merely the peroxide associated with only from 3 to 5 per cent. of carbonic acid; and is, therefore, not entitled to its pharmaceutical name.

A very pure, mild, and permanent form of a protoxide-salt may, however, be easily obtained by exposing clean particles of iron, as bits of iron wire, to the action of tartaric acid and water at a gentle heat. An effervescence ensues, hydrogen is disengaged from the water, the iron is oxidized to a *minimum*, and is fixed in that state by its instantaneous combination with the acid of tartar. This tartrate owes its permanence to its insolubility; but yet (like iron filings and calomel) it acts energetically on the system. The prototartrate of iron is nearly white, and pulverulent. The powdery matter, as diffused in the liquid, may be decanted off the iron into a filter, and washed with a little water. It has a mild chalybeate taste, and will constitute a valuable accession to the *Materia Medica.*

At a dull red heat, this tartrate readily takes fire, and burns slowly away like tinder, after its removal from the source of heat, with the exhalation of a caromel odour; while the oxide of iron becomes peroxidized.—*Quarterly Journal of Science, Literature, and Art.*

Formulæ for different Compounds prepared with Sarsaparilla. By M. Beral, Pharmacien.

[Although we have devoted a large space already to Dr Hancock's valuable paper on Sarsaparilla; yet as this drug is unquestionably one of great importance, and much of the fluctuation of opinion respecting its absolute and relative value, has probably arisen from the different modes employed in the preparation of it for exhibition, we feel it a duty to place before our readers every suggestion respecting these preparations that may come well recommended. It affords us pleasure, moreover, to transfer to our pages the papers of those liberal apothecaries, who, flinging aside the penny-wisdom of keeping secrets, step generously forward to aid the cause of science and humanity. We shall give the entire paper].

Of the numerous compounds, in which the principles extracted from sarsaparilla constitute the base, there are few whose mode of preparation is unexceptionable, and not many formulæ, unsusceptible of receiving some useful modifications. I have attempted some reforms, and submit to the Society of Pharmacy some new formulæ for these kinds of compounds, and the processes proper for their preparation.

Extract of Sarsaparilla with diluted Alcohol, or Hydralcoolic extract of Sarsaparilla.

℞.—Alcohol diluted, 20° Baumé	16 pounds.
Sarsaparilla bruised	2 pounds.

Macerate the root in the fluid for one month, then decant and filter through paper. Withdraw the alcohol from this tincture by distillation, and concentrate the liquid remaining in the water bath, in order to procure a soft extract, of which the quantity is generally about four ounces. A little before terminating the concentration of the extract, and while it is still sufficiently fluid, it ought to be filtered a second time.

This extract is preferable to those obtained by cold or hot water. Its properties are more active, not only because it is free from the gummy substance of the sarsaparilla, which the others contain in large quantities, but also because it contains none of the fecula of the root. M. Beral might also have added, because the alcohol is evaporated at a lower temperature than water, and the operation is performed in a retort.

Aqueous solution of the extract of Sarsaparilla.

℞.—Pure water	1 pound.
Extract as prepared above	1 drachm.

Dissolve the extract in the water and filter through paper. One pound or 16 ounces of this solution represents one ounce of sarsaparilla.

Alcoholic solution of the extract of Sarsaparilla.

℞.—Alcohol diluted, 20° Baumè	14 ounces.
Extract of sarsaparilla, as above	2 ounces.
Total	16 ounces.

Dissolve and filter. One ounce of this solution represents one ounce of sarsaparilla.

Vinous solution of extract of Sarsaparilla.

℞.—Spanish wine	15 ounces.
Extract of sarsaparilla	1 ounce.
	16

Dissolve and filter through paper.

Syrup of Sarsaparilla, more properly Syrup of the extract of Sarsaparilla.

℞.—Extract prepared with diluted alcohol	1 pound.
Water	8 pounds.
White sugar	15 pounds.
	24 pounds.

Dissolve the extract in the water, by means of a gentle heat. Then add the sugar, and continue the same heat until it is completely dissolved. Suffer it to get cold, and strain it. The formula for this syrup is simple, its execution is easy, and a few minutes are sufficient to prepare it. There can be no doubt of the qualities of the product.

Syrup.	*Extract.*	*Sarsaparilla.*
24 ounces represent	1 ounce	8 ounces.
1 ounce represents	1 scruple	8 scruples.

Sudorific Syrup of Cuisinier, reformed.

℞.—Extract prepared with diluted Alcohol	1 pound.
Syrup prepared with sugar	8 pounds.
Syrup prepared with honey	7 pounds.
	16
Special aqueous tincture	8 pounds.

Mix the whole in a basin, and concentrate with a gentle heat to a syrup, in quantity about 16 pounds.

Syrup, 1 pound and 1 cuillerée*, represent,

Sarsaparilla	8 ounces	2 drachms.
Senna	2 drachms	4 grains.
Flowers of Borage	2 drachms	4 grains.
Pale rose petals	2 drachms	4 grains.
Anise-seeds	2 drachms	4 grains.

Aqueous Tincture for the preparation of the Sudorific Syrup of Cuisinier.

℞.—Anise-seeds	6 ounces.
Senna	6 ounces.
Flowers of Borage	6 ounces.
Petals of pale roses	6 ounces.
	24 ounces.
Boiling water	12 pounds.

Infuse the materials in the boiling water for 12 hours, afterwards subject them to a press, and finally filter.

Vinous extract of Sarsaparilla, commonly called portable tisane of Sarsaparilla.

℞.—Extract of sarsaparilla prepared with diluted alcohol	1 pound.
Madeira wine	3 pounds.
	4

Dissolve and filter.

Vinous extract, 1 ounce, represents 2 ounces of sarsaparilla.

---

* Cuillerée is equal to ʒiij., 24 grs. French.

For the preparation of Tisane.

R.—Common water	4 verres.[*]
Vinous extract of sarsaparilla	2 cuillerées.
Tisane 16 ounces represent of sarsaparilla	2 ounces.
Tisane 1 verre represents of sarsaparilla	½ ounce.

Sudorific Mixture of Dr Smith.

R.—Sarsaparilla	8 drachms.
China root	2 drachms.
Liquorice	2 drachms.
Guaiacum	2 drachms.
Sassafras	2 drachms.
	16 drachms.

Cut, incise or rasp each substance, and mix them carefully.

Sudorific extract of Dr Smith.

R.—Diluted Alcohol, 20° Baumè	16 pounds.
Sudorific mixture of Dr Smith	2 pounds.

Macerate the materials in the spirit for one month, then filter through paper Distil off the alcohol, and concentrate the liquid in a water-bath, to the consistence of a soft extract: the quantity will be about 4 ounces.

Sudorific Wine of Dr Smith, commonly called rob sudorifique, concentrated essence, or liquid extract of Sarsaparilla.

R.—Extract sudorific of Dr Smith	1 pound.
Madeira wine	7 pounds.
	8
Volatile oil of sassafras	64 drops.

Agitate the oil with the wine, dissolve the extract and filter.

In the wine, 1 ounce includes	of extract,	1 drachm.
	of oil,	½ drop.

---

[*] Un verre is equal to ℥vj., ʒij. French.

In the wine, 1 cuillerée includes $\begin{cases} \text{of extract, } \frac{1}{2} \text{ drachm.} \\ \text{of oil, } \frac{1}{4} \text{ drop.} \end{cases}$

In the wine, 1 ounce represents 1 ounce of the sudorific mixture.

In the wine, 1 cuillerée represents 4 drachms of the sudorific mixture.

For many years a preparation has been employed in England, the virtues of which have been attributed to the sudorific mixture of Dr Smith, who was the author of it. When properly prepared according to the above formula, this compound possesses valuable properties.—*Journal de Pharmacie, Dec.* 1829.

New Salifiable Organic Base.

MM. Pelletier and Coriol announce that they have discovered a new alkaline substance, in a bark which frequently comes mixed with the cinchona. Some seroons arrived from the province of Aréquipa in Peru, containing this variety of bark. It was shipped from the port of *Arica* to a house in Bordeaux, for Calisaya bark; though some of the seroons were entirely filled with the spurious article. Notwithstanding this clue to its origin, they were unable to establish the botanical character of the tree which furnished it. The bark resembles the Calisaya in its colour, texture and physical properties generally. But in their taste they differ; the Calisaya is nearly a pure bitter, while the one in question joins to the bitterness a warmth and acrimony something like the true Angustura.

The *Arica* bark, as they call it, may be deprived of this alkaline principle by the same process as is adopted in the decomposition of cinchona.

This substance, in its physical properties, strongly resembles the cinchonia, but in its chemical habitudes is essentially different. Like cinchonia, it is white, transparent, and crystallizes in rigid needles. When heated it melts at a degree below that which decomposes it, but it is not volatalized like cinchonia, according to M. Robiquet.

The principle of the Arica bark is absolutely insoluble in water, for which reason it at first appears tasteless, but by holding it in the mouth for some time, it imparts a bitter and acrid sensation: dissolved in an acid, its taste is developed, and is extremely bitter. Examined in combination with the mineral acids, the differences between the new alkali and cinchonia are most apparent. Sulphate of cinchonia crystallizes in rhomboidal prisms, but while the new alkali unites with, and saturates sulphuric acid, the salt is not crystallizable by means of water. Dissolved in boiling water, the solution assumes on cooling, the form of a white tremulous jelly, like a solution of ichthyocolla in milk of almonds. This jelly by drying becomes of a horny consistence, which may be restored to the gelatinous form by again using boiling water as its solvent.

This sulphate, dissolved in alcohol, crystallizes in silky needles, closely resembling those of the sulph. of quinia. The alkaloid crystals then are insoluble in water. The saline are soluble in this fluid boiling, and assume the gelatinous form on cooling. The alkaline crystals are soluble in ether, the saline are not.

Dissolved in concentrated nitric acid, this new alkali assumes an intensely green colour. When the acid is a little weaker, the colour though green is clearer, and a diluted acid occasions no change of colour. The capacity of this substance for saturation is much more feeble than either quinia or cinchonia, and the most of its combinations cannot be brought to the point of neutrality. It is composed of oxygen, carbon, hydrogen, and azote, but the azote is in much less proportion than in any of the other alkaloids. It is not poisonous. Its effects on the animal economy are about to be tested; but the authors are not prepared yet to give a detail of them, nor of the chemical properties of the bark, and its constituents. These will appear at length in a memoir from which the above facts are extracted.—*Journal de Pharmacie, November* 1829.

New Process for the Preparation of Morphia, &c. By M. J. B. Fauré, Pharmacien. (Extracted from a Thesis sustained at the School of Pharmacy.)

As every thing relating to morphia is so interesting at present, no apology is necessary for offering to our readers a new formula for its preparation. After having examined the several processes proposed by different chemists for the separation of this alkali, M. Fauré is disposed to give the preference to the following, which he says furnishes a larger product, and is less expensive.

Take of opium	1 part.
Cold water	4 parts.

He proceeds; I divided the opium into very small pieces, and subjected it to three successive macerations, at a temperature of 12 to 15° of Centigrade. For the first, I employed half the water indicated; for the second, one third; and finally, the remainder of the water for the last maceration. The solution was facilitated by malaxating and frequently stirring the mixture.

The liquors, being reunited and filtered, were evaporated to the consistence of a soft extract, which was dissolved in a quantity of water equal to that first employed for the macerations. This gave a troubled solution which was suffered to deposit for some hours. The supernatant fluid was poured off clear, and the remainder filtered. The two liquors were again reunited, and again evaporated to the state of a soft extract, which was heated as in the first case. These operations were repeated five times before an extract was procured that would not form a troubled or opake solution with water. The precipitation takes place more rapidly in proportion to the coldness of the water. To the last solution of the extract in water, were added two ounces of animal charcoal for every kilogramme of opium employed. This was suffered to remain for some hours, the mixture being frequently stirred to facilitate the decolourizing action of the carbon.

After the liquor was filtered and concentrated, and while in a boiling state, a slight excess of liquid ammonia was added, which precipitated all the morphia in the form of brilliant light-coloured spangles, (*hydrate of morphia*). This was separated by a filter and washed with cold water until it ceased to colour the fluid. Afterwards it was dissolved in boiling concentrated alcohol, to which animal charcoal was added. The solution being filtered, the morphia precipitated in crystals. A second solution in boiling concentrated alcohol will render it *perfectly* pure.

We shall pass over the speculations of the author respecting the influence which the elements of opium exercise over each other in the native compound, as we have not space for all the matter that is presented to us.

Of this hydrate of morphia, he says:

When pure it is in the form of little brilliant, white plates, which are less than those of uncombined morphia, and more readily soluble in acids and alcohol, because of their inferior cohesion.

It is composed of morphia, 100 parts; water, 5 parts. This is proved by a given quantity of pure sulphuric acid requiring for saturation 100 parts of *morphia*, and 105 parts of the *hydrate*. One hundred and five parts of the hydrate of morphia, submitted for several days to a heat of 30°, lost five parts by an exposure to a temperature a little greater than that of boiling water.

On the Mutual Action of Sulphuric Acid and Alcohol, and on the Nature of the Process by which Ether is formed. By Henry Hennell, Esq. Communicated by William Thomas Brande, Esq. F.R.S.[*]

1. I was some time since engaged in an investigation of the nature of oil of wine and of the salts called sulphovinates: the results I obtained were considered of sufficient importance to be honoured with a place in the Philosophical Transactions[†]. The oil of wine and sulphovinic acid are substances produced during the mutual action of sulphuric acid and alcohol in the well known process adopted for the preparation of ether; and an important point with me, during the above investigations and since that time, has been to develope the particular changes which take place when ether is formed from sulphuric acid and alcohol. I perceive by the *Annales de Chimie* for November last, that MM. Dumas and Boullay have been engaged on the same subject, and have experimented on and considered, not only the formation of ether, but also the nature of sulphovinates, and, as they supposed, though incorrectly, of oil of wine[‡]. That our results with regard to sulphovinates and oil of wine differ, may be seen from the published accounts; and there is not less difference between their conclusions with regard to etherification, and the results I have obtained, which I have now to describe.

2. When alcohol and sulphuric acid in equal weights are put together without the application of any heat beyond that generated during the mixture, the most abundant and important product is sulphovinic acid, above one-half of the sulphuric acid being converted into that peculiar acid by union with

---

[*] From the Philosophical Transactions for 1828. Part I.

[†] Phil. Trans. 1826. Part III.

[‡] The substance which these gentlemen operated upon appears, from their own account of its preparation, to have been the hydrocarbon separable from oil of wine by the action of alkalies, and not that peculiar substance which has hitherto been called oil of wine.

hydro-carbon*. But when such a mixture containing so large a proportion of sulphovinic acid is distilled, the most important product is a new substance, namely ether, and the sulphovinic acid disappears. The questions which then arose were, whether the ether was formed altogether from the direct action of the remaining alcohol and sulphuric acid in the mixture, or whether the sulphovinic acid might not also assist, or whether it might not be an essential state of the elements intermediate between the mixture of the acid and alcohol and the development of the perfectly formed ether. MM. Dumas and Boullay, who have considered the same questions, or at least some of them,—decide, that the portions of materials which form ether, are altogether independent of those which produce sulphovinic acid: but the following facts prove in my opinion the contrary of this conclusion.

3. A portion of oil of vitriol was selected from some comparative experiments, and also some alcohol of specific gravity 0.820: five hundred grains of the oil of vitriol, precipitated by acetate of lead, gave 1500 grains of sulphate of lead.

4. Five hundred grains of the oil of vitriol were mixed with five hundred grains of the alcohol, and, after forty-eight hours, diluted and precipitated by acetate of lead; only 616 grains of sulphate of lead were produced; so that very nearly three-fifths of the sulphuric acid had become sulphovinic acid by the effect of mixture, and little more than two-fifths remained to act as sulphuric acid upon the remaining alcohol, full two-thirds of the quantity employed.

5. Another mixture of acid and alcohol in the same proportions, and made at the same time as the above, was then distilled until 117 grains had passed over, consisting of water, alcohol, and a portion of ether. The residue in the retort had not undergone any charring effect; and, being diluted, was precipitated by the acetate of lead: the quantity of sulphate of lead obtained, amounted to 804 grains, indicating an increase

---

* The sulphuric acid loses half its saturating power by the union, and all the salts formed by the new acid are soluble.

in the quantity of sulphuric acid equivalent to 188 grains of sulphate of lead.

6. A similar mixture of alcohol and sulphuric acid, made at the time and in the same proportions as the two former, was then distilled until two hundred grains had been received, the greater part of which was ether; the uncharred residual matter in the retort being then diluted, was precipitated by acetate of lead as before; 986 grains of sulphate of lead were obtained. This contained nearly two-thirds of the sulphuric acid first added, and the increase by distillation had been much more than one-half of that which existed before the application of heat: so that during the distillation, and simultaneously with the formation of ether, a quantity of sulphovinic acid had been reconverted into sulphuric acid, and the latter appeared to increase in quantity in proportion to the increase of ether in the distilled products.

7. A similar mixture of alcohol and acid, made at the same time and in the same proportions as the three former, was then distilled until two hundred grains had passed over. Two hundred grains of water were added to the contents of the retort; 160 grains were distilled off; a second addition of two hundred grains of water was made, and the distillation continued: a further addition of five hundred grains of water was made, and the operation continued until as much product had been separated as equalled the water added;—the object was to separate all the ether and alcohol possible, for the purpose of ascertaining to what extent the conversion of sulphovinic acid into sulphuric could be carried. No smell of sulphurous acid was produced during the operation, nor did any charring of the contents of the retort occur; when precipitated by acetate of lead, 1480 grains of sulphate of lead were obtained. This is very little short of the 1500 given by the acid when unacted upon by alcohol, and shows that nearly the whole of the sulphovinic acid had been changed back into the state of sulphuric acid; and is completely at variance with the opinion, that when sulphuric acid and alcohol act upon each other, hypo-sulphuric acid is formed.

8. From these experiments it appeared probable that the

ether was the product of the decomposition of the sulphovinic acid: but a mixture of equal weights of alcohol and sulphuric acid contains, besides the sulphovinic acid, a considerable quantity of unaltered acid and alcohol; for in such a mixture three-fifths (4) of the sulphuric acid would be converted into sulphovinic acid by combination with the hydro-carbon of less than one-third of the alcohol employed. I next proceeded to ascertain, whether, when no alcohol was present, ether would be produced. A quantity of the sulphovinate of potash was therefore prepared. The composition of this salt has been given in the paper in the Philosophical Transactions before referred to, and one hundred parts contain 28.84 of potash. Five hundred grains were mixed with 150 grains of sulphuric acid, being nearly the equivalent of the potash in the salt, and then heat applied. The experiment therefore may be considered as the distillation of sulphovinic acid mixed with sulphate of potash, which it may be presumed remained inert during the process, and also with the water of the acid and of the salt. The proportion of water, it is found, has an important influence; but in the present experiment about a drachm of fluid distilled over, and left a blackened and acid salt in the retort, having the smell of sulphurous acid. A few grains of carbonate of potash being added to the distilled product, abstracted a little water: the clear decanted liquor was then mixed with a little dry muriate of lime, and by agitation separated into two portions; the upper one being decanted, amounted to nearly half a drachm, and was found to be pure ether. This result proves that ether may be formed from a sulphovinate or sulphovinic acid when no alcohol is present.

9. An experiment similar to the last in the nature and proportions of the substances used, was made, except that the sulphovinate was dissolved in its own weight of water previous to the addition of the sulphuric acid. The experiment is one therefore of the distillation of dilute sulphovinous acid, in place of that which is concentrated. The distilled product had no smell of ether, nor could any be discovered in it. About nine fluid drachms were obtained; to these, carbonate of potash was added, which separated the water, and left three drachms

of a supernatant liquid, appearing by taste, smell and flame, to be alcohol: this was decanted, and poured upon muriate of lime; no ether separated, but the whole formed one solution; being distilled from the muriate it was evidently alcohol; and being mixed with its weight of sulphuric acid, gave sulphuric ether or sulphovinic acid again.

In this experiment there was no charring of the contents of the retort; and by precipitation by acetate of lead, the whole of the sulphuric acid was obtained;—not only the portion added to decompose the salt, but the double portion evolved from the sulphovinic acid upon the separation and rearrangement of the hydrocarbon.

10. In the former paper it was shown that oil of wine when heated in water is resolved into hydrocarbon and sulphovinic acid: an experiment was therefore made upon it. Two hundred grains of oil of wine were placed in a retort, a little water added, and heat applied: about a drachm was received, which, being redistilled from carbonate of potash, the product appeared to be principally alcohol, but the presence of ether was very evident. This experiment proves the formation of ether from sulphovinic acid when no sulphuric acid was present as such at the commencement of the distillation.

With regard to the questions at the commencement of this paper, it appears to me from the facts detailed, that in the usual process for obtaining ether, the ether is not formed altogether from the direct action of the alcohol and sulphuric acid considered independently of the sulphovinic acid present; for the quantity of free sulphuric acid is small compared to the quantity of alcohol present, two-fifths only of the acid remaining, while of the alcohol more than two-thirds remain; and further, sulphovinic acid alone is readily converted into ether and sulphuric acid, (see 8.) and during the distillation of ether in the ordinary way the sulphovinic acid is always reconverted more or less completely into sulphuric acid (4. 5. 6.) it probably therefore assists much in the process. With regard to the third question, the opinion may be supported that the formation of sulphovinic acid is a necessary and intermediate step to the production of ether from alcohol and sulphuric acid; and although I do not mean to assert this view, yet it deserves a few remarks.

In no manner which has yet been devised can ether be formed from alcohol and sulphuric acid without the presence of sulphovinic acid. Whenever ether has been formed, sulphovinic acid has been present; whenever the sulphuric acid is diluted so far as not to form sulphovinic acid with alcohol, it also refuses to form ether with alcohol. Sulphovinic acid will produce ether without the assistance of alcohol. And although the ether produced, when a mixture of equal weights of alcohol and sulphuric acid are distilled, appears to be in greater quantity than can arise from the decomposition of the sulphovinic acid existing in the mixture previous to the action of heat, it is not I think inconsistent to suppose, that at the same time that one portion of sulphovinic acid is resolved into sulphuric acid and ether, another may be formed from alcohol and sulphuric acid; and that sulphovinic acid is formed in a mixture of sulphuric acid and alcohol by heat, is proved by the following experiment. Five hundred grains of oil of vitriol were diluted by five hundred grains of water; when cold, to the dilute acid was added two thousand grains of alcohol, specific gravity 0.820. The following day this mixture was examined for sulphovinic acid, but none had been formed: it was placed in a retort, and a quantity distilled off nearly equal to the weight of the alcohol employed: this had a specific gravity of 0.842. Carbonate of potash separated a considerable portion of water, the original alcohol would not even moisten that salt; the residue in the retort was examined, and now sulphovinic acid was found; the evidence of which was, carbonate of lead being dissolved in considerable quantity; here sulphovinic acid had been formed by heat, where it did not previously exist. This result appears also opposed to the opinion that in the formation of ether the sulphuric acid acts simply by abstracting water from the alcohol; for the dilute acid here gave up a portion of its water during the distillation, and separated from the alcohol a portion of hydrocarbon.

It has already been shown (9) that the production of ether is materially influenced by the quantity of water present, and that the same sulphovinic acid will yield either ether or alcohol, as it is in a concentrated or dilute state. The hydrocarbon which, as was shown in the former paper, has the extraordinary power in oil of wine of neutralizing the whole of the acid properties of sulphuric acid, and in sulphovinic acid of neutralizing the half of them, being in the latter body in so peculiar a condition that it will unite either with that proportion of water necessary to form ether, or with the larger proportion requisite to form alcohol, according to circumstances.

In the experiments (8. 9.), in the production by distillation of ether or alcohol from sulphovinic acid more or less diluted, it appeared that sulphovinic acid might easily have its proximate elements separated and restored to their original state of sulphuric acid and alcohol. The following experiment was made with a view to illustrate this point. Five hundred grains of acid and five hundred grains of alcohol were mixed as before, and left for several days: by previous experiment it is known that more than half the sulphuric acid in this way becomes sulphovinic acid (4). By distillation and dilution at proper periods this would have given ether and alcohol, and nearly the whole of the sulphuric acid (7.): but instead of doing this, it was mixed with one thousand grains of water, and then distilled until 1400 grains had passed over. No charring or decomposition of the sulphuric acid took place; no ether was formed; but nearly the whole of the original alcohol and sulphuric acid were recovered. It may be a question whether the production of alcohol and ether in those and similar experiments is altogether determined by the proportion of water present, or whether the difference of temperature consequent upon its variation may not have an effect.

When ether and sulphuric acid are heated together, oil of wine and sulphovinic acid are amongst the products obtained; and as this sulphovinic acid is readily converted when diluted into alcohol and sulphuric acid, so it affords a method of converting ether into alcohol: thus ether may be formed from alcohol, and alcohol from ether at pleasure, by throwing the hydrocarbon of these bodies into that peculiar state which it assumes when combined with sulphuric acid in sulphovinic acid. We may even proceed beyond this, and form either alcohol or ether, using olefiant gas as the hydro-carbon base: for I have shown in my last paper, that olefiant gas, by combining with sulphuric acid, forms sulphovinic acid, and the acid so produced forms either ether or alcohol, according to circumstances which are under perfect command.

It can hardly be necessary to refer to the extraordinary remark at the end of MM. Dumas and Boullay's second paper, except to state that it is singularly at variance with the facts and opinions given throughout the former part of that and the preceding paper by the same authors. Those persons who read both papers, and also those of Mr Faraday and myself, which were published long before the appearance of the former, will be able to decide without further comment from whom the particular views contained in those papers first emanated.—*Annals of Philosophy.*

Apothecaries' Hall.

Miscellany.

Citric Acid from Gooseberries.—M. Tilloy has obtained citric acid from this fruit at less than half the price it usually costs in France. Bruise and ferment the gooseberries, distil off the alcohol, and press the residue. Heat the liquor obtained by pressure, and add carbonate of lime until effervescence ceases. Collect the citrate of lime; wash, drain and press. The mass is coloured and contains malate of lime in mixture. Add water until it is of the consistence of thin syrup; heat, decompose by sulphuric acid, and dilute the whole with twice its weight of water. Separate the precipitate by a filter, and to the liquor add carbonate of lime. Collect this precipitate on a filter; wash, drain and press, and again precipitate with sulphuric acid. The clear liquor now obtained is to be boiled with animal charcoal, filtered and evaporated. When sufficiently concentrated, allow the liquid to deposit, and then put it into stoves heated between 68 and 72° F. Crude crystals of citric acid will thus be obtained, which are to be washed and recrystallized.—*Journal de Pharmacie, from Quarterly Journal of Science, Literature and Art.*

Pinic Acid a constituent of Venice Turpentine.—M. Unverdorben states, in a memoir published in the *Annalen der Physik und Chemie* for 1827, that Venice turpentine repeatedly distilled with water, leaves in the retort a semi-viscid mixture of resin with oils. The alcoholic solution of this gives a green precipitate with the alcoholic solution of acetate of copper. This is pinate of copper, and, when dissolved in alcohol sharpened with muriatic acid, may be decomposed by water, the *pinic acid* precipitating in the form of a white resinous substance. Washed with boiling water and alcohol, and the latter removed, it remains solid, inodorous and almost insipid.

Pinic acid dissolved in alcohol, is gradually altered by exposure to the air; it is affected by heat also and forms only neutral combinations. It unites with the alkalies, potash and soda, through the medium of an ethereal solution. An excess of either of these alkalies precipitates the neutral concentrated solution; the same effect is produced by the neutral salts. This acid also forms salts with magnesia, baryta, alumina, manganese, lead, zinc, copper, and other metals. Some of these are little soluble, others completely so in ether; none are very soluble in absolute alcohol. M. Unverdorben ranks pinic acid immediately after the benzoic.—*Quarterly Journal of Science, Literature and Art,* *Dec.* 1828.

The Silvic Acid is another substance described in the same memoir, and is found in the resin of the *pinus sylvestris,* and fir tree. This is procured by acting on the resin with alcohol, several times, which dissolves every thing but the *silvic acid.* The latter crystallizes almost entirely on cooling, is colourless, and requires a higher temperature than 212° for fusion. Cold absolute alcohol and ether do not dissolve more than one-third of their weight; when boiling they take up more. This feeble solubility distinguishes it from most resins. This acid crystallizes in quadrangular prisms. Volatile oils dissolve it in all proportions.

The silvates have nearly the same properties as the *pinates;* the former, however, in some instances form *acid* salts. The silvate of copper is soluble in absolute alcohol, which distinguishes it from the pinate of that metal.—*Quarterly Journal of Science, Literature and Art,* *Dec.* 1828.

Chemical Constitution of Acetic Ether.—M. Planiava concludes from experiment, that acetic ether is formed of one equivalent of acetic acid and two equivalents of alcohol; that therefore it is a subacetate of alcohol, and is represented by the number 97.—*Kas. Archives.*

Nut-galls an Antidote to Strychnia.—M. Guibourt cured a dog which was poisoned by the police, with strychnia or nux vomica, by causing him to swallow powered nut-galls: the convulsions immediately ceased. Milk and manna given the next day completed the cure. The same vegetable astringent, says M. Caventou, will arrest vomiting and destroy the power of emetic tartar; and M. Orfila advises their exhibition as an effectual antidote to the poisonous properties of opium or the salts of morphia.—*Bull. Universelle. Quart. Jour. of Lit. Sci. and Arts.*

Chlorine, Iodine and Bromine, Antidotes to the Vegetable Alkalies.—M. Doune communicated to the Royal Academy of Sciences, that the tinctures of iodine and bromine, and alcohol impregnated with chlorine, when added to the *uncombined* vegetable alkalies, destroyed their poisonous properties. Thus the iodides, bromides, and chlorides of strychnia and brucia, given to dogs in doses of two and a half grains, produced no deleterious effects: while half a grain of strychnia will produce tetanus and death. These antidotes, when given to arrest the effects of the poison, must follow its exhibition very quickly, since the lapse of ten minutes is sufficient to allow the poison to make an impression, which cannot be controlled by the antidote. Bromine appears to be the least efficacious of the three. But these compounds are all decomposable by acids; therefore they are inapplicable to the salts of morphia, and other alkalies. It is suggested that possibly some of the vegetable acids may possess a feebler affinity for these salts, and perhaps it may be found that the natural meconate of morphia, present in opium, may be decomposed by iodine, or bromine. If so, an antidote to this poison, may be discovered, which is of all others the most frequently employed for destroying life.—*N. A. Med. and Surg. Journ. from Révue Médicale for Sept.*

Test of Myrrh.—M. Bonastre states that the tincture of genuine myrrh is rendered of a dark red colour by the addition of nitric acid, while the spurious kinds, and all gum resins at present known, yield a yellowish colour under similar circumstances.—*N. A. Med. and Surg. Journ. from Nouvelle Bibliotheque, Aout* 1829.

Copaiba.—At a meeting of the Academy of Medicine of Paris, M. Guibourt remarked, that copaiba is readily soluble in alcohol, and affording a hard resin by boiling in water, was easily solidified with magnesia. But that if it remained soft after being boiled, and did not entirely dissolve in alcohol, it was a proof that it contained some fat oil, which prevented the solidification. He also said that ammonia, recommended as a test for the purity of copaiba, by M. Planche, does not always afford certain indications. M. Batka, a distinguished pharmaceutist of Prague, who was present, stated that copaiba, contaminated with any fixed oil, was speedily saponified by an alcoholic solution of pure potassa, but that when pure balsam was used, no such effect followed.—*Archives Generales, October* 1829.

On the same occasion M. Chevallier observed, that if pure copaiba be spread on unsized paper, and exposed to a gentle heat, it leaves by drying a stratum of resin, without straining the paper. If, on the contrary, any fixed oil be present, it does not dry, and leaves a resinous appearance, but an oily areola is formed around the drop of *copaiba.—Journal de Chémie Médicale, November* 1829.

Active Medicinal principle in the Root of Chiococca Racemosa.—The discovery of this substance was announced to the Royal Academy of Sciences of Paris, by MM. de Francois and Caventou. The shrub which furnishes this root is commonly called *cainca,* and grows in the forests of Brazil, on the bank of the river of diamonds, where it is termed *raiz preta* or black root. It is diuretic and purgative. The principle alluded to is a substance sui generis. It is white, crystallizable, and the crystals arrange themselves in groups of small silky needles, like those of the muriate of morphia. Though destitute of odour it possesses a strong aromatic bitter taste. It dissolves in alcohol and ether, and partially in water. It burns like other vegetable bodies, but leaves no residue.

It is not alkaline, nor yet perfectly neutral, but as it is readily dissolved by alkaline solutions, it approaches nearer to the characters of an acid.

This substance is derived from the bark of the root, is taken up by boiling water, reddens the paper of turnsole, and is precipitated from the decoction in a pulverulent form, by the addition of acids. It appears to owe its suspension in water, according to M. Caventou, to the presence of lime; but, as the precipitate cools, it assumes the crystalline form.

In the hands of Dr Francois it has proved a powerful diuretic. It does not purge, though the root in powder and the extract are said to display cathartic properties. The form of exhibition has been that of pills, and no unpleasant consequences have been observed to follow its employment. A diuretic that would seldom disappoint our expectations is a desideratum in medicine. And as this substance has received no small praise, we hope it will not be long before some of our enterprising apothecaries will order some of it from Paris. —*N. A. Med. and Surg. Jour. from Revue Médicale, et Journal Generale de Médicine for September.*

Alkaline principles in the Willow Bark.—M. Leroux, an apothecary at Vitri-le-Francais, was announced by M. Magendie on the 22d of June, at the Academy of Sciences of Paris, as the discoverer of two vegetable alkalies in the bark of the willow, bearing a strong similitude in all their properties to quinia and cinchonia. To MM. Gay-Lussac and Thenard was committed the charge of examining these alkalies.—*N. A. Med. and Surg. Jour. from Jour. Gen. de Méd. for July.*

Ergot of Maize.—In the Revue Medicale for August, is contained a memoir, communicated to the Royal Academy of Sciences of Paris in July, by Dr Roullin, on the subject of the ergot of maize or Indian corn. This was frequently observed by the doctor during his residence in South America, and he says in some respects it resembles the ergot of rye, but in others is sensibly different. The form of this excrescence is that of a little tubercle from one to two lines in thickness, and from three to four in length. It is not as in the rye an elongated grain, but consists of a small cone engrafted upon a sphere, and resembles a pear in shape. It has no peculiar smell, and is of a livid colour. When eaten by man, it occasions the hair to fall off, and a looseness, and even entire loss of the teeth when the quantity taken is large. Similar effects are produced on animals: swine, which at first refuse, finally become very fond of it, and then experience the same deprivation of hair, and ultimately an emaciation and loss of power in the hind legs. Their flesh when eaten, after the progress of the disease to this extent, produces no unpleasant consequences. Mules eat the grain freely with similar effects, but are cured by removal to distant pastures. Hens, which live upon it, lay their eggs, without any calcareous envelope: the organs for expelling these bodies being stimulated to *abortion* before a shell can be formed. Monkeys, parrots, wild dogs and deer, who attack the fields, are often seen to fall as if drunk, without the power to rise again.

In the human subject, neither gangrene, nor convulsive disorders follow its use. This disease of the maize does not extend over any very great extent of country. It is unknown in Peru, Mexico, and the central republics. Dr Roullin never heard of it beyond Neyba and Mariquita in Colombia, and only in the warm parts of these provinces. It is stated by the natives to lose all its deleterious properties by being carried beyond the *Paramos,* high mountains where it is always cold. —*N. A. Med. and Surg. Jour. for January.*

Method of preparing Narcotic Extracts.—The following method of preparing these extracts, invented by Mr Battley, London, has been found to answer every purpose in preserving the green colour and medicinal properties of the plants. Plants, which from circumstances cannot be operated on immediately, must be revived by immersing their stalks in water for twelve or eighteen hours. Those that recover by this means, and become of as lively and fresh a green as when growing, are to be bruised, pressed, and the juice passed through a fine hair sieve, and immediately placed on the fire. A quantity of green coloured matter begins to rise and float on the surface of the liquid, some time before it is brought to the boiling point; this matter is very abundant in the juices of some plants, but in all cases it is to be carefully removed by means of a perforated tin dish. By the time the liquor cools, or soon afterwards, the green matter ceases to appear. Rather more than half the fluid is to be evaporated by boiling, and then the remainder put into a conical pan, and suffered to remain there until it becomes cold. A large precipitate of dark green coloured feculent matter subsides from the supernatant liquor, which is to be poured off, and again evaporated to one-half, when it is also to be allowed to precipitate. This second precipitation is not near so green in its colour. The fluid from this is also to be boiled until it acquire the consistence of syrup. To this is to be added the matter obtained by the first precipitation and filtration, and the whole placed in a metallic pan, seated in a water bath, and further evaporated till it assumes the consistence of an extract.

The latter part of the process requires the constant attention of the operator until it is completed. It is not necessary that the matter be constantly stirred, but it should never be suffered to stick or become hard on the sides of the pan; for if it be allowed to harden, the extract loses its green colour, and in proportion to such loss is the deterioration of its medicinal virtues.—*London Medical Repository, Vol. IV.*

TO SUBSCRIBERS.

The appearance of the first number of our second volume offers a pledge to the public, that the work will not be interrupted, and we therefore solicit those who wish to subscribe from the commencement, to inclose the subscription for two years, viz. $5. As there are many of our subscribers who have not paid for the first volume, probably because of the difficulty of remitting so small a sum, we may take the liberty to make the same request of them. Our terms are *in advance*, and if we continue to send them the numbers of the second volume until October, we shall then cease, unless we receive remittances before the appearance of the fourth number, which will complete our second volume.

ERRATA IN VOL. I.

Page 27, *for* De Candowle, *read* De Candolle.
166, *for* lesser, *read* less.
170, *for* Dicandria, *read* Decandria.
173, *for* fall, *read* pass.
192, *for* Cajupati, *read* Cajuputi, Plate, No. 3.
265, *for* praecox, *read* præcox.
266, *for* Wheelan, *read* Wheeling.
266, *for* quinque panax folium, *read* panax quinquefolium.
269, *for* Pimente, *read* Pimentæ.
289, *for* Octoedral, *read* Octahedral.
294, *for* Octoedral, *read* Octahedral.
294, *for* Tetraedral, *read* Tetrahedral.

In the explanation of the abbreviations in the Pharmacopee Universelle, published in our last number, page 312, our readers will please to observe that the letters employed to designate the titles of *Dispensatories and Pharmacopœias ought not to have been italicised.* Those prefixed to the names of *authors* of formularies, dispensatories, &c. *are, as they should be, italics.* We are sorry for the mistake, as we have already, and may again introduce formulæ from this Pharmacopee Universelle, with the letters of reference attached, and unless the above explanation be borne in mind, no one will be able to discover whether the reference in the formulæ is to official works or to the name of some author.

JOURNAL

OF

The Philadelphia College of Pharmacy.

NEW SERIES.

VOL. II.—JULY 1830.—NO. II.

Original Communications.

Das Brom und seine Chemishe Verhältnisse. Von Carl Löwig.

Bromine and its Chemical Combinations. By Charles Lowig. Heidelberg, 1829. *Translated and abridged by Elias Durand.*

Mr Charles Löwig, professor of chemistry in the university of Heidelberg, and formerly a manufacturing chemist in Kreuznach, published last year, under the above title, a very interesting monograph of bromine, which we have read with the greatest satisfaction. From the abilities of the author, his indefatigable perseverance in chemical pursuits, and from the excellent opportunity he had of fully investigating the properties of this substance, which is contained in a comparatively large quantity in the bittern of the salt-works of Kreuznach, we expected much information, and indeed we have not been disappointed. His monograph of bromine is undoubtedly the most complete that has yet appeared, and he has not only given the results of his own experiments, but has also availed himself of all that had been already published on the same subject by Messrs Balard, Serullas, Desfosses, Liebig, De la Riva, Hermann, Vogel, &c.

As a medical agent, bromine is not yet entitled to much consideration. However, it seems to possess a great analogy with iodine; and has been exhibited successfully by Dr Barthey, Pourelle and others, both externally and internally, in cases of brouchocele, scrofula and syphilis, either edulcorated with forty parts of distilled water, and administered in doses of from five to eight drops, or in the state of hydrobromate of potassa, bromide of mercury, &c.; but more experiments are wanting before it may be ranked amongst the articles of the Materia Medica. It is only as a *new simple body* that our author has treated his subject; and we hope that the singular properties of this substance, its great analogy with chlorine and iodine, to both of which it is intermediate, and its first discovery in sea water, a fluid so often before submitted to chemical analysis without any manifestation of its presence, will render the following abstract of Mr Löwig's work highly interesting and new to a great number of our readers.

Bromine, in exterior appearance, resembles so much the chloride of iodine, that both these fluids have been considered by many chemists as perfectly identical; but the ingenious experiments of Messrs De la Rive and Vogel have proved in a satisfactory manner that bromine was really a simple body.

Mr De la Rive filled a small glass cup with bromine and introduced into it the two platinum wires of a galvanic pile. On approaching the extremities of both wires, the galvanometer gave no indication whatever of the smallest variation, as generally happens when distilled water is acted on in the same way. He afterwards filled a similar small cup with a mixture of distilled water and a small quantity of bromine, and submitted it to the influence of the voltaic battery; a copious evolution of gas took place at the extremity of both wires, which gas proved, on careful examination, to be oxygen at the positive pole, and hydrogen, in the proportion of two to one of oxygen, at the negative pole. Thus nothing but water was decomposed.

Starch, which is the best test for iodine, which colours it blue, is also the test for bromine, a few drops of which communicate to it a beautiful orange colour. When bromine is added to a solution of starch, already turned blue by iodine, a combination is obtained producing two distinct colours, one brownish and the other yellowish. If this combination of bromine and iodine, found in the solution of starch, is submitted to the action of galvanism, a handsome blue colour, indicating the presence of iodine, is instantly perceived at the negative pole, whilst an orange colour is produced at the positive pole, where bromine seems to be attracted. By this experiment the smallest quantity of bromine and iodine existing in a solution of starch may always be easily detected.

Vogel found that when dry chlorine and iodine came in contact, they were converted into a dark orange fluid, which, for odour, colour and solubility in water, alcohol and ether, was scarcely distinguishable from bromine; but the following difference was found to exist between these two substances: Sulphurous and hydrosulphuric acids acted upon the chloride of iodine by instantly changing it to a deep brown colour and precipitating iodine; whilst, on the contrary, these same acids bleached completely the bromine and transformed it into a liquid as limpid as water. The alkaline solutions, those of ammonia and baryta, precipitated a considerable quantity of iodine from its combination with chlorine, whereas they only deprived bromine of its colour.

From these experiments it is evident that if bromine were a compound containing iodine, the latter, when a solution of bromine and starch is acted upon by electricity, would accumulate at one of the poles and produce a blue colour; but De la Rive, by submitting this solution for a length of time to the action of the pile, ascertained that no change of colour was produced at either of the poles, and that nothing but water was decomposed. The same result is obtained when a solution of iodine and starch is exposed to the same influence, whereas with a solution of chlorine no evolution of hydrogen takes place, because chlorine, possessing a greater power of affinity with the bases than iodine and bromine, combines instantly with hydrogen to form hydrochloric acid, which remains in solution.

On the other hand, if bromine were a combination of chlorine and iodine, it would form with the alkaline solutions both an alkaline iodate and a hydrochlorate; but experiment proves to the contrary, for if the salt of the oxacid, which is immediately precipitated when bromine is added to a concentrated alkaline solution, be heated and afterwards treated with manganese and sulphuric acid, it will be found that the very same substance is obtained, which is also produced when the salt of the hydracid, which remains in solution, is evaporated to dryness and treated in the same way. These few experiments seem to prove clearly that bromine is a simple body.

Bromine was discovered in 1826 by Balard, a young pharmaceutist of Montpellier in France, who was led to this discovery by observing that when the lie of the ashes of warm plants containing iodine was treated by a mixture of chlorine and starch, not only a blue colour was produced, but also a zone of an orange colour appeared just above it. Balard called it at first *muride;* but this name was soon after changed into that of *bromine*, from Βρωμος, a strong smell.

Balard's discovery was scarcely known before researches were made, in order to discover bromine wherever it was supposed likely to be found. Liebig was the first who obtained it from the salt-works of Kreuznach; Balard found it in the state of hydrobromates of magnesia and soda in sea-water, in marine plants, and several marine animals; and finally, its existence was ascertained by other chemists in the waters of the Dead and other seas, in salt-mines, in several mineral springs, in sponges in the state of hydrobromate of lime, in the ores of zinc of Silesia, and generally in almost all the salt-works, but in such a small quantity that it is impossible to obtain it on a large scale. The salt-works of Kreuznach seem as yet to be the most productive; from thirty pounds of the bittern, Liebig obtained three drachms and a half of bromine and one grain of iodine*.

---

* In order to ascertain whether a mineral spring contains any bromine, evaporate the water and crystallize the greatest part of the salt; then sepa-

The extraction of bromine from the various mother-waters of the salt-works is founded upon the greater affinity which chlorine possesses for the bases with which bromine is combined. Thus, it is obtained either by evolving chlorine from a mixture of common salt, manganese and sulphuric acid, and transmitting it into the bittern; or by liberating chlorine in the bittern itself, by means of sulphuric acid and manganese, when the liquor contains any other hydrochlorates but that of lime; or by manganese and hydrochloric acid. Mr Löwig gives an account of the different processes employed by Balard, Desfosses and Hermann in the production of bromine; but we shall, here, mention only the method which he has found most advantageous to obtain that substance from the bittern of the salt-works of Kreuznach.

The bittern is evaporated to one-third its volume in large iron kettles and left to crystallize. The mother-water is then separated, diluted with water, and sulphuric acid added to it as long as it forms a precipitate. The liquid is now decanted, the precipitate strained, and the whole evaporated to dryness. The dry mass is mixed with an equal weight of water, by

---

rate the mother-water by means of the filter, and put it into a narrow glass tube. On dropping a few drops of concentrated liquid chlorine, the orange colour is immediately produced, and increases in intensity as a larger proportion of chlorine is added. When the mother-water has acquired a certain degree of colour, this colour vanishes gradually, and finally disappears completely.

It is necessary to be very cautious as to the quantity of chlorine which is employed, as an excess of it would prevent the whole reaction from taking place; the mother-water should also be free of any organic matter.

If iodine exists at the same time in the same fluid, the only modification of the process to be resorted to consists in mixing starch with the mother-water, and to continue the addition of liquid chlorine as long as the blue colour is perceptible. With this due caution, there will be a moment at which the fluid loses all its colour, and by the addition of a few more drops of chlorine, the yellow colour will instantly be produced by the reaction of bromine. By ascertaining the quantity of solution of chlorine required to let free the bromine from a determinate quantity of mother-water, it will be easy to determine in what proportion bromine is contained in the water.

which a great quantity of sulphate of lime is separated; and is then distilled, with manganese and hydrochloric acid, in a retort furnished with a long neck, which plunges under the surface of a small quantity of water contained in a receiver surrounded with a freezing mixture. On applying heat, a disengagement of red vapours of bromine is produced, which condense mostly in the neck of the retort. The portion of bromine which passes in the state of vapours is dissolved by the water, and that which condenses into drops in the neck of the retort runs down to the bottom of the vessel by its own specific gravity, which is considerable. The water soon becomes saturated with bromine, and no other portion is lost except that which may volatilize in the atmosphere. In order to obtain it pure and anhydrous, it must be distilled again over some chloride of lime.

Bromine viewed in mass and by reflected light is a fluid of a dark blackish colour; but when a thin stratum is interposed between the light and the observer, it appears of a hyacinth red. Its smell is very strong, disagreeable and penetrating; its taste powerful, astringent, burning and repulsive; it acts with energy on organic matter, and stains the skin of a yellow colour, rather lighter, however, than that produced by iodine; this stain soon passes to brown and disappears, after destroying the epidermis only, and generating a violent itching and burning.

According to Balard, the specific gravity of bromine is 2.966; Löwig, by weighing a large quantity of it, at 60° Fahr. found it to be 2.98 to 2.99. It does not redden litmus paper, but bleaches it entirely, almost as readily as chlorine. It congeals between 0° and —2° Fahrenheit in a solid, crystalline and lamellar mass, exhibiting many spots of a lead colour and metallic lustre. A great part of it remains in the solid state even at +10°. It is extremely volatile, and produces dense vapours in the atmosphere. It boils between 113° and 117°, and its vapours are not dissimilar to those of the nitrous acid gas, and weigh rather more than 5.0.

The vapour of bromine is a new supporter of combustion; a lighted taper is soon extinguished in it; but before it goes out, it burns with a greenish flame at the base and red at top, as in chlorine gas. Bromine is a new conductor of electricity; when its solution is submitted to the action of a galvanic battery of a moderate strength, it accumulates on the positive pole, when its presence may easily be discovered by the smell; whilst, at the other pole, no such indication of bromine is given.

Bromine poured in sulphuric acid sinks to the bottom, and may be thus preserved in an open vessel, without undergoing any alteration. Its atomic weight, according to Liebig, is 75.288 hydrogen = 1 and 94.110 oxygen = 10; Löwig found it to be 75.76 hydrogen = 1.

COMBINATIONS OF BROMINE.

Bromine and Water.

A. *Hydrate of bromine* is produced—first, by mixing bromine with a small quantity of water and exposing the mixture to a freezing temperature; second, by conducting vapours of bromine through a glass tube wetted with water, at a temperature of 39° or 40° Fahrenheit. By the first method beautiful octahedral crystals are afforded, resembling in colour those of the ferrocyanate of potassa; by the second, a crystalline mass, without any determinate form, is deposited in strata in the tube. This hydrate is composed of

Bromine	75.76	or	1 atom,
Water	90.00		10 atoms.

This combination is not altered at a temperature below 60°; but above this point it is decomposed and resolved into bromine and water, which separate; on exposing them again to the freezing point, they combine anew to form a crystalline hydrate. In all its combinations the hydrate of bromine acts exactly as pure bromine.

B. *Solution of bromine.*—A hundred parts of water at 60° absorb three parts of bromine, and form a solution of a deep red colour. Its smell is similar to that of pure bromine, and of an astringent but not acid taste. This solution is not altered at a temperature of —4°, nor even below that degree; but at a gentle heat, or on exposure to the air, the bromine is entirely evolved, and the fluid gives no indication of acid properties. After several weeks it is decomposed at the ordinary temperature, with generation of hydrobromic acid and evolution of oxygen; this decomposition takes place much sooner when the solution is exposed to the solar rays.

Bromine and Oxygen.

Bromic acid is the only combination of bromine and oxygen with which we are yet acquainted. It cannot be procured in a direct way, at any temperature, and has not yet been obtained in an anhydrous state. Its composition is represented by 75.76 or one atom of bromine, and 40.00 or five atoms of oxygen.

It is obtained in the liquid state by two different processes: first, by adding gradually sulphuric acid to a solution of bromate of baryta, until all this earth is precipitated, and evaporating gently the liquor; second, by Berzelius' process for obtaining chloric acid, which consists in saturating boiling water with bromate of potassa and decomposing the solution while hot with a small excess of a solution of fluo-silicic acid, which unites with the potassa and forms a salt sparingly soluble, whilst the bromic acid is liberated. After boiling the liquor for a while it should be filtered, and bromate of potassa added to it until no more gelatinous precipitate is thrown down. The bromate of potassa which has escaped decomposition is then either precipitated by alcohol, or evaporated by a gentle heat.

Liquid bromic acid, reduced by evaporation to the consistence of a syrup, is a colourless fluid; its point of congelation is still unknown. It reddens litmus, and soon bleaches it completely. Its taste is purely acid, and it has scarcely any smell. Nitric and sulphuric acids have no chemical action upon it; but the latter, when highly concentrated, produces a considerable effervescence with evolution of bromine and oxygen. This phenomenon seems to be produced by the great elevation of temperature resulting from the action of the strong sulphuric acid upon the water of the bromic acid. It is decomposed by all the hydracids, and by the oxacids which are not completely saturated with oxygen, and is precipitated by the salts of silver, the protonitrate of mercury, and the concentrated solutions of the salts of lead.

The salts of this acid are mostly crystallizable, and are all decomposed by heat when mixed with a combustible body. They detonate either by percussion or heat, with still more energy than the chlorates, and this mixture becomes partially combustible by contact with sulphuric acid.

Bromine and Hydrogen.

A. *Hydrobromous acid* is produced by the decomposition of the bromide of potassium by sulphuric acid, and condensing in water the vapours which are evolved; or by adding bromine to a solution of hydrobromic acid. This acid has not yet been obtained in an insulated state; its solution is of a dark red colour, its smell similar to that of bromine, and its taste peculiarly acid. It dissolves gold, and is converted by heat into vapours of bromine and hydrobromic acid gas, and the liquid becomes sour, colourless, and diminishes in density.

B. *Hydrobromic acid* exists in nature in the state of combination with soda, baryta or magnesia, in sea water, in marine animals, and in almost all the salt-works. It has yet been obtained only in the state of gas; but there is no doubt that it may be reduced to the liquid state, either by pressure or by cold. Its specific gravity is 2.71. It is colourless, of a strong acid taste, and fumes considerably on exposure to air. It reddens litmus powerfully, and applied to the skin it produces a considerable inflammation and itching. It is incombustible, a non-supporter of combustion, and resembles in general appearance the hydrochloric acid gas; its composition is as follows:

Bromine	75.76	or	1 atom,
Hydrogen	1.00	or	1 atom.

The hydrobromic acid gas is soon absorbed by water, with a considerable evolution of caloric, and forms thus the *liquid hydrochloric acid*, which, in a saturated state, is a fuming liquid, possessing all the properties of a strong acid. This liquid acid is obtained, 1. By uniting bromine, phosphorus, and a great proportion of water. The bromine must be added by small portions, for the reaction takes place with a considerable disengagement of light and caloric; the addition is continued until all the phosphorus has disappeared. In this operation two acids are formed, the hydrobromic and phosphoric; the former is separated from the other by a gentle heat. 2. By adding to a watery solution of bromine some diluted hydrosulphuric acid, sulphur is precipitated and hydrobromic acid generated, which may be separated by filtration. If the bromine is not entirely dissolved, a bromide of sulphur will be produced and precipitated with the sulphur, and both will be converted into sulphurous and hydrobromic acids. 3. By distilling bromide of potassium with three-fourths its weight of sulphuric acid, previously diluted with sixteen parts of water; by exposing the product to the air, the bromine which may have passed over uncombined escapes.

Liquid hydrobromic acid is colourless, and its specific gravity, when concentrated, is 1.29; its point of congelation is still unknown. In the state of concentration it disengages a great abundance of thick fumes, and boils the sooner as it is more concentrated, evolving a portion of its hydrobromic acid gas; at a small degree of concentration it boils only at a temperature above 212°. Similar in this respect to the hydrochloric acid, a strong solution of hydrobromic acid is rendered weaker by ebullition, whilst a weak solution gently evaporated becomes stronger. The evaporation must not be done at the point of ebullition, otherwise all the acid should be driven off. Its taste is very acid. Liquid hydrobromic acid, as well as the hydrobromic acid gas, is decomposed by chlorine, sulphuric and nitric acids, and the metallic oxides.

Bromine and Carbon.

These two bodies do not combine in a direct manner; but when bromine is dissolved in ether, alcohol, oil of turpentine or other vegetable liquids, a portion of bromine unites with the hydrogen of these liquids, and form hydrobromic acid, whilst another portion combines with their carbon and generates a bromide of carbon; and a third portion unites to both carbon and hydrogen, and constitutes the hydrocarburet of bromine.

A. *Liquid bromide of carbon* is prepared by introducing in a glass tube two parts of bromine and one part of iodide of carbon. The latter is instantly decomposed with a great development of caloric, and a hissing noise similar to that produced by plunging in water a piece of red hot iron. One part of the bromine unites with the carbon of the iodide of carbon and forms the liquid bromide of carbon, whilst the other part combines with the liberated iodine and constitutes a bromide of iodine. The whole is then treated with water, which dissolves the bromide of iodine and precipitates the bromide of carbon. The latter retains a little bromine, which colours it; it is purified by the addition of a sufficient quantity of caustic potassa.

Liquid bromine of carbon is colourless, very volatile, much heavier than water; its smell is penetrating and ethereal; it has a taste exceedingly sweet, which it communicates to water, although sparingly soluble. It becomes solid at from 41° to 43° Fahrenheit, and acquires the consistence and friability of camphor.

It is composed of carbon 6 and bromine 75.76, or one atom of each. It is not altered by exposure to the air, even in its colour, as the iodide of carbon is.

B. *Dry bromide of carbon* is obtained by dissolving bromine in alcohol, of 36° of Baume's areometer. A considerable effervescence takes place, with development of heat, and evolution of vapours of hydrobromic acid and of bromine. When this solution is cooled, add to it a solution of caustic potassa, until the mixture becomes colourless, then dilute with water and evaporate gently the alcohol. As soon as the liquor begins to cool, a small quantity of lemon coloured oil, heavier than water, separates, and forms in a short time a crystalline mass, similar to camphor. This peculiar substance may be purified by solution in alcohol and precipitation by water. It is white, lamellar, resembling camphor, friable, greasy to the touch and heavier than water; melts at a moderate heat, and evaporates at 212°, subliming by the contact of cold bodies. Its smell is pleasant, somewhat similar to that of nitrous ether; its taste is sharp and burning, becoming sweet and producing a sensation of freshness not dissimilar to that of peppermint; its composition is the same as the preceding.

This substance dissolves in water at 122°, and the solution acquires the same flavour and evaporates at a higher temperature. In its liquid state it is transparent and colourless. In contact with the flame of an alcohol lamp, it burns with emission of hydrobromic acid gas; but it goes out soon after having been removed from the flame.

C. *Hydrobromide of carbon* is prepared by introducing some bromine in a receiver filled with olefiant gas; or by mixing bromine and sulphuric ether. If the former be in excess, a great quantity of caloric is disengaged and hydrobromic acid is instantly produced. This mixture, submitted to distillation, yields first some hydrobromic acid, and very soon after an oily fluid passes over, which it is necessary to receive in another vessel; the distillation is stopped as soon as about two-thirds of the whole mixture has passed over. The last product is well washed with a solution of potassa, in order to separate the acid which may have passed with it.

It is an oily and colourless fluid, of specific gravity 2.78 to 3; it does not redden litmus paper. Its taste is sweet, aromatic, ethereal, and more agreeable than that of the hydrochloride of carbon. Its composition is as follows:

Carbon	12	2 atoms	carburetted hydrogen gas,
Hydrogen	02	2 atoms	
Bromine	75.76	1 atom.	

Transmitted through a red hot glass tube, it is converted into carbon and hydrobromic acid gas; in contact with ignited bodies it burns with a green flame, evolution of hydrobromic acid gas, and with a thick smoke of divided charcoal. It is sparingly soluble in water, but is dissolved easily in alcohol, ether, and concentrated acetic acid. These solutions are precipitated by water.

Bromine and Boron.

This combination is not yet perfectly ascertained.

Bromine and Phosphorus.

A. *Sesquibromide of phosphorus* is obtained by adding to bromine, perfectly free of water, small pieces of phosphorus of about one-fourth of a grain, until the red colour of bromine has disappeared entirely. The sesqui bromide of phosphorus is freed from the excess of phosphorus by distillation. It is a limpid and colourless fluid, even at 10° Fahrenheit, very volatile, smoking in the air, of a smell similar to that of hydrobromic acid. When entirely freed from water, it has no action on litmus, but it slightly reddens it when it contains any moisture. It is composed of

Phosphorus	16	or	1 atom,
Bromine	113.64	or	1.5 atoms.

It is soon decomposed by warm water, and alkaline and metallic solutions; but cold water acts very slowly upon it; it sinks to the bottom and is decomposed only after long shaking.

B. *Perbromide of phosphorus* is obtained by uniting the sesqui bromide with more bromine. It is solid and of a yellow colour; it melts at a pretty high temperature, and forms in the air thick vapours of a fetid smell. Its composition is

Phosphorus	16	or	1 atom,
Bromine	189.40	or	2½ atoms.

It is converted by water into phosphoric and hydrobromic acids, with a considerable evolution of caloric; by metals, into metallic bromides and phosphurets; and by metallic oxides, into bromates and phosphates.

Bromine and Sulphur.

A. *Subbromide of sulphur.*—Bromine in contact with sulphur forms an oily fluid. Seventy-five parts of bromine, at a common temperature, take up thirty-two parts of sulphur. It is of a reddish colour, much darker than the chloride of sulphur. Its smell is unpleasant, and almost similar to that of the latter compound. Its taste is hot, bitter and sour, but it does not redden litmus-paper. It is formed of two atoms of sulphur and one atom of bromine.

B. *Simple bromide of sulphur* is obtained by distilling the subbromide of sulphur, when the excess of sulphur remains in the retort; or by adding to the subbromide as much bromine as it already contains. It is a red and limpid fluid, heavier than water, very volatile, fuming in the air, and swelling as the subbromide. Its taste is very acid and hot, but it does not redden litmus. It contains one atom of sulphur and one of bromine.

When vapours of bromide of sulphur come in contact with red hot iron, combustion takes place, bromine is liberated and sulphuret of iron produced. It is slowly decomposed by cold water, detonates feebly with boiling water, and is converted into hydrobromic, sulphuric, and hydrosulphuric acids; it is also decomposed by nitric acid and ammonia.

C. *Bromide of carburetted sulphur.*—Bromine and carburetted sulphur combine very easily together, and form a red and transparent fluid, heavier than water, and very fetid; water has no action upon it, but the fixed alkalies and ammonia form with it bromates and hydrobromates, and liberate the carburet of sulphur.

Bromine and Selenium.

These two bodies form together different combinations; two parts of selenium and five of bromine appear to be the most lasting compound. Pulverized selenium mixed with bromine produces a noise similar to that of a red hot iron plunged into water, disengages a considerable quantity of caloric, and in a moment is converted into a solid mass, of a reddish brown colour. It fumes in the air, and its smell resembles that of chloride of sulphur. Poggendorff considers it as a mixture of deuto and trito bromides of selenium. It dissolves in water, and forms a colourless solution when there is no free bromine present.

Bromine and Iodine.

A. *Subbromide of iodine.*—This compound is obtained by mixing bromine and iodine and submitting them to distillation; vapours of a brownish red colour are disengaged, which condense in tufts of fern-like crystals.

B. *Protobromide of iodine* is prepared by adding another portion of bromine to the above compound. It forms a dark brown fluid of an unpleasant smell and of a sharp taste, bleaches litmus without previously reddening it, and is composed of one atom or 125 parts of iodine, and one atom or 75.76 parts of bromine. It is soluble in water, and gives to that liquid the bleaching property; and is decomposed by the alkaline solutions, and converted into hydrobromate and iodate, without separating any of its constituents. By introducing gaseous bromine into water at 36° Fahrenheit, containing a small quantity of iodine, the latter is instantly dissolved, and soon after lanceolate crystals of a dark yellow colour are produced. These crystals are an *hydrate of bromide of iodine*, composed of

Iodine	1 atom	or	125.00,
Bromine	1 atom	or	75.76,
Water	10 atoms	or	90.00.

The hydrate of bromide of iodine remains solid at 40°, but above that point it separates into bromide of iodine and water, retaining a small quantity of the latter.

Chlorine and Bromine.

Chloride of bromine is produced by transmitting a current of chlorine through bromine, and condensing the vapours by means of a freezing mixture. This compound is a reddish yellow fluid, rather lighter than bromine itself. Its smell is penetrating, and its taste very unpleasant. It is very volatile; its vapours are of a dark yellow colour, and it bleaches litmus without reddening it. The composition is

Bromine	75.76	or	1 atom,
Chlorine	35.40	or	1 atom.

Metals burn in chloride of bromine, with generation of metallic chlorides and bromides. It is decomposed by the alkaline solutions. At the freezing point it forms with water a crystallized hydrate, of a light yellow colour, composed of one atom of chlorine, one of bromine, and ten of water. Chloride of bromine dissolves easier in water than the bromide of iodine, and without decomposition. It forms a yellowish solution, possessing the smell of both chlorine and bromine.

Hydrochlorate of bromine.—Concentrated hydrochloric acid dissolves a large quantity of bromine; the solution resembles in colour, smell, and power of dissolving gold, the hydrobromic acid.

Nitrogen and Bromine.

It is not yet ascertained whether by treating bromine with ammonia, or with the ammoniacal salts, a combination can be produced, analogous to that obtained with chlorine and iodine; but cold nitric acid dissolves about as much bromine as pure water does, and acquires a yellowish red colour. Heat disengages bromine from this combination.

Hydrobromate of ammonia is obtained by saturating a solution of ammonia with hydrobromic acid and evaporating the liquid; by combining equal volumes of ammoniacal and hydrobromic acid gases, or by treating bromine with ammonia. The decomposition of bromine by ammonia is attended with a considerable evolution of caloric; nitrogen is disengaged, whilst bromine unites with the hydrogen, and combines with the undecomposed ammonia, to form an hydrobromate. It is solid, white, but on exposure to air it becomes yellow, and seems to be transformed into a hydrobromate by yielding a portion of its hydrogen to the oxygen of the atmosphere. It crystallizes in long prisms, covered with smaller ones, forming right angles with the former, and heat vaporizes it without decomposition on melting. Its taste is sharp and salt. It is composed of one atom or 17 of ammonia and one atom or 75.76 of hydrobromic acid.

Bromate of ammonia is produced by mixing liquid ammonia with liquid bromic acid; it crystallizes in acicular crystals and sometimes in grains. Its taste is sharp and cooling. It is converted by a gentle heat into bromine and nitrogen, which are disengaged, and into hydrobromate of ammonia. This compound may also be obtained by treating the bromate of baryta by the carbonate of ammonia. Its composition is 17 or one atom of ammonia, and 115.76 or one atom of bromic acid.

[To be continued.]

On Polygala Senega. The Seneka Snake Root. By Daniel B. Smith.

The Seneka Snake Root is a plant belonging to the Linnæan class Diadelphia, and order Octandria. It is the type of a natural order called Polygaleæ, to which the Krameria Triandra also belongs. The leaves of the polygaleæ have generally a bitter astringent taste, which is much stronger in the roots, combined with an acrid and somewhat resinous flavour. This genus is a beautiful example of the manner in which occasional irregularities in structure are compensated by nature. When we examine the stamens, we find them possessing the character of the Leguminosæ, one of the most distinctly marked of all the natural orders. Instead, however, of the papilionaceous flower, with its keel and banner and wings, we have a tubular corolla approaching to the character of the labiatæ. To make up for the absence of the wings, the two lateral segments of the calyx are expanded into roundish-ovate, flattened, wing-like leaves, which are white, like petals, and may be considered as a part either of the calyx or corolla.

"The polygala senega has a firm hard branching perennial root, consisting of a moderately solid wood and a thick bark. This root sends up a number of annual stems, which are simple, smooth, occasionally tinged with red. The leaves are scattered, nearly or quite sessile, lanceolate, with a subacute point, smooth, paler underneath. Flowers white, in a close terminal spike. The calyx, which in this genus is the most conspicuous part of the flower, consists of five leaflets, the two largest of which, or wings, are roundish ovate, white and slightly veined. Corolla small, closed, having two obtuse lateral segments, and a shorter crested extremity. Capsules obcordate, invested by the persistent calyx, compressed, two celled, two valved. Seeds two, oblong ovate, acute at one end, slightly hairy, curved, blackish, with a longitudinal, bifid, white appendage on the concave side. The spike opens gradually, so that the lower flowers are in fruit while the upper ones are in blossom."—*Bigelow.*

The Seneka snake root is a native of every part of the United States; though it is most abundant in the southern and western states, where it is collected in great quantities, and exported in bales of from two to four hundred weight. The root, as it occurs in commerce, varies from the size of a small quill to that of the little finger. It presents a thick knotty head, which exhibits the traces of the numerous stalks, and from which proceeds a moderately thick, tapering root, that is branched, twisted, and covered with a corrugated, transversely cracked epidermis, which is yellowish brown in the young, and brownish gray in the old roots. The root frequently exhibits crowded annular protuberances, and has a projecting keel-like line extending along its whole length. The bark is thick, hard and resinous, and contains the active principle of the plant: the central woody part is white and inert.

Seneka snake root has a faint aroma, which is, at first, not unlike that of ginseng, but soon becomes nauseous. The taste is at first mucilaginous and sweetish, and being chewed becomes somewhat pungent and acrid, and produces a very peculiar irritating sensation in the fauces. These properties are communicated to the watery decoction, which is more acrid than the alcoholic tincture; and although not unpleasant to the taste at first, soon manifests the peculiar pungency of the root, spreading through the fauces, or exciting a copious discharge of saliva, and frequently a short cough. Seneka snake root communicates neither taste nor smell to water distilled from it. Alcohol extracts its virtues; and the tincture is decomposed by the addition of water, which precipitates a resinous principle. "Iron produces little change in solutions of this root, and gelatin occasions no alteration whatever."

M. Peschier, of Geneva, obtained from six ounces of Polygala, one hundred grains of a principle which he calls *polygaline*, and supposes to be alkaline in its nature ; he thinks it is united to a new acid, which he calls the *polygalinic.* He also pretends to have discovered another substance in this plant which he calls *isolysine.* These results, however, have been called in question. M. Feneulle, pharmaceutist at Cambray, has also analysed this plant, and obtained, 1st, pale yellow colouring matter; 2d, bitter substance; 3d, gum; 4th, pectic acid; 5th, albumen; 6th, volatile oil; 7th, fat oil; 8th, acid malate of lime and other salts, with a base of potassa, lime and silex. Another analysis, by M. Dulong d'Astafort, gave the following results: 1st, peculiar alkaline matter; 2d, resin; 3d, gummy matter (mucus); 4th, colouring matter analogous to wax; 5th, yellow colouring matter; 6th, matter coloured red by sulphuric acid; 7th, pectic acid; 8th, acid malate of lime and potassa; with other salts having bases of potassa, lime and iron. Finally, an analysis of M. Folki produced, 1st, a thick oil, in part volatile; 2d, free gallic acid; 3d, wax; 4th, an acrid principle; 5th, yellow colouring matter; 6th, azotated matter; 7th, various salts. The whole virtues of the plant are extracted by proof spirits, although the decoction is for practical purposes the most efficacious preparation.

The Seneka snake root is often mixed with the roots of ginseng (Panax quinquefolium) to which admixture, perhaps, the peculiar smell of fresh Seneka may be ascribed. It grows in the neighbourhood of Philadelphia, in the woods below the falls of Schuylkill, and at the Friends' Asylum for the insane near Frankfort.

It enters into most of the officinal lists, and is celebrated as a sudorific and expectorant in small doses, and an emetic and cathartic in large ones.

The following account of its officinal preparations is chiefly extracted from the "Pharmacopée Universelle."

Extractum Senegæ Radicis. (*fu. pr. s.*)

℞ Rad. polygalæ senegæ	℔j.
Spiritûs vini gallici	℔vj.

Digest for some days in a gentle heat, filter the tincture, and evaporate to the consistence of honey. Boil the marc with three pounds of water, strain and evaporate to the same consistence; mix the two extracts and reduce to the proper consistence. (*fu.*)

℞ Radicis senegæ	℔ij.
Aquæ	℔ix.
Alcoholis	℔iij.

Digest for twenty-four hours, distil off the alcohol, and reduce the rest to a proper consistence. (*pr. s.*)

Dose six to fifteen grains.

Tinctura Senegæ. (han. *vm.*)

℞ Radicis senegæ	1 part,
Alcohol	6 parts.

Infuse in the cold for several days. (*vm.*)

Han. directs five ounces of the root and two pounds of alcohol.

Dose thirty drops several times a day.

Decoctum Senegæ.

℞ Rad. senegæ	℥j.
Aquæ	℔ij.

Reduce to one half by ebullition, (am. ed. lo. wu. ww. *br. c.*) b.* prescribes three ounces of root, and two pounds of water reduced to one-third; fu. and g. one ounce of root to a pound and a half of water, reduced to a pound.

℞ Rad. senegæ	℥j.
Aquæ	℔ij.

Boil and reduce to one pound, strain, and add syrup. simplicis ℥j. (*sa. sw.*)

℞ Rad. senegæ	℥j.
Glycyrrh. glab.	℥ss.
Aquæ	Oiss.

Boil and reduce to a pint. (*e.*)

Syrupus Senegæ.

℞ Rad. senegæ	℥j.
Aquæ bullient.	Oiss.

Reduce by boiling until ten ounces of the strained liquor are left; add sacch. alb. ℔iss.

Make a syrup. (b.* fi. han. po. pr. su.)

℞ Rad. senegæ	1 part,
Aquæ	12 parts.

Infuse with a gentle heat, in a covered vessel, for several hours; strain the infusion, and add of white sugar eighteen parts. Make a syrup. (*vm.*)

Decoctum Diureticum.

℞ Rad. senegæ contus.	℥ss.
Scillæ incis.	℈j.
Aquæ	℥xij.

Boil down to one-third, strain, and add

Spiritus æther. nitr.	ʒij.
Tinct. opii	℈ij.
Mel. glycyrrhizæ	℥j. (hum.)

Decoctum pectorale corroborans, Haustus pectoralis incitans.

℞ Rad. senegæ	ʒij.
Aquæ	q. s.

to obtain six ounces of decoction, to which, after it is strained, add oxymel scillæ ℥i. Misce. (*b.*)

℞ Rad. senegæ ʒij.
Aquæ q. s.

to obtain eight ounces of decoction; to which, when strained, add camphor (triturated with mucilage of gum arabic) ʒi. M. (*b.*)

℞ Rad. senegæ ʒij.
Decoct. cinchon. bullient. q. s.

to obtain seven ounces of strained liquor; add
Camphor (triturated with mucilage of gum arabic) ʒss.
Æther. sulphuric. gutt. xxx.
Syrup. cortic. aurant. ℥j.
Syrup althææ ℥i.
M. (*b.*)

℞ Rad. senegæ ʒss ad ʒi.
Rad. glycyrrh. ʒij.
Aquæ ℥iij.

Infuse, and add to the strained liquor tinct. opii camph. ʒi. syrupi althææ ʒiv. M. (*aw.*)

Dr Coxe's Hive Syrup is prepared by making a decoction of equal parts of senega and squills in sixteen parts of water boiled down to eight parts. The strained liquor is then boiled with four parts of clarified honey to the consistence of a syrup, and a grain of tartarized antimony added to every fluid ounce of the syrup.

It is a popular remedy in this city in croup and recent coughs, and is much used. As generally prepared, it is a very inelegant preparation, and resembles a sweetened decoction rather than a syrup. A preparation having similar virtues has been made in the following manner; and possesses these advantages over the formula of Dr Coxe, that it requires less boiling, and is more uniform in its results. There can be no doubt that maceration for some hours in boiling water, in a covered vessel, will extract all the active principles that water is capable of taking up from the roots.

℞ Rad. senegæ	℥viij.
Rad. scillæ siccatæ	℥viij.
Aquæ bullient.	Oiv.

Macerate in a covered vessel near the fire for four or five hours, and press and filter the infusion, which will measure about two and a half pints. Then add mel. clarificat. ℔iv. sacch. alb. ℔ij. Boil to the consistence of a syrup, and to every ounce of the syrup add a grain of tartarized antimony.

On Weights and Measures. By Benjamin Ellis, M.D.

From a work on the elements of pharmacy by Samuel F. Gray, we republished part of a chapter on weights and measures in the third number of our Journal; and as it made some more pretensions to research than we usually find in similar works on the same subject, a few editorial remarks were prefixed, recommending it to the attention of our readers. Since that time I met with the report made to the senate on weights and measures by John Quincy Adams, Esq. when secretary of state of the United States, in the year 1821.

This report displays great research and profound learning, and occupied the secretary four years in its preparation. As I consider it to be a standard work on weights and measures, and as the author of the elements of pharmacy appears to have committed some mistakes in reference to the early history and changes in the British system of metrology, I shall draw from the report the materials for an essay on the subject.

Weights and measures are so interwoven in the whole fabric of society, so indispensable to almost every transaction in the arts and sciences, and in trade, and the facts so abundant, that it seems difficult to avoid redundancy, and to mould to a popular form, a subject, abstract in its nature and depending on calculation. But as these instruments are so immediately connected with the business of the apothecary, their history and theory must be interesting to him. I shall therefore endeavour, as concisely and clearly as possible, to present him with a view of the principles on which the ancient English and modern French systems of metrology are founded. As preliminary to the discussion of these matters it may be proper to remark, that uniformity in weights and measures has, since any attention has been paid to the subject by human governments, been a great and leading object with statesmen and philosophers. To accomplish this, the most powerful talents and untiring perseverance have been enlisted, but hitherto without success. It is not necessary to state these difficulties in detail, but they are founded in the nature of man, the limited power of the most absolute monarchs, and the physical constitution of things. Uniformity in weights and measures may have reference to several objects, but I shall confine myself to its relation to these instruments themselves. In these respects it may be either of identity or of proportion. "By a uniformity of identity is meant a system founded on the principle of applying only one unit of weights to all weighable articles, and one unit of measures of capacity to all substances thus measured, liquid or dry.

"By an uniformity of proportion is understood, a system admitting more than one unit of weights, and more than one of measures of capacity; but in which all the weights and measures of capacity are in an uniform proportion to each other."

From the names given to many of our measures, such as the foot, cubit, span, pace, &c. we find that primitive man must have derived these standards from his own person. In adapting the skins of animals to his body for clothing, he would discover the standard for the measure of length, and the subdivisions of that standard.

Superficial measures, vessels of capacity, and the length or distance from one point on the earth's surface to another will naturally spring from the wants of domestic society. Linear measure may be made a measure of circumference; but while the man would employ the cubit or forearm for ascertaining the length of his house or his cabin, he would make use of the pace to mark distances on the surface of the ground.

These natural standards are constantly referred to, by the civilized man as well as the savage, by the philosopher as well as the peasant.

But we have, in the instance before us, a source of diversity in linear measure, flowing from the constitution of man and his relations with the physical world. We have two standards for measures of length, and, as will be shown, not reducible into each other.

Measures of capacity are rendered necessary for holding fluids, and those fruits and seeds which are so abundantly supplied by the earth, and which, to be measured or confined, must be surrounded by vessels of compact and uniform substance.

These however cannot be derived from his own person, and he must look abroad, into the great store-house of nature, for the shell of some large gourd, or the cast off covering of some testaceous fish.

In the infancy of human society, a common standard not being wanted, these measures will be of various dimensions.

When linear measure comes to be applied to the mensuration of surfaces and solids, the necessity of numbers will become apparent, and these will be supplied to man in the number of his fingers. The elements of decimal arithmetic, as well as linear measures, are thus to be found in the members and divisions of the human body. But though admirably adapted for the purposes of computation, decimal arithmetic is not equally applicable to the numeration, multiplication or division of material substances, either in his own person or in physical nature. That the human body and its members are not in the proportions of decimal arithmetic, is apparent from the following facts. The cubit for obvious reasons will be the unit or standard of linear measures. The cubit is the half of the ell or arm, from the middle of the breast to the end of the middle finger. The fathom is the space between the extremities of the two middle fingers, with expanded arms, exactly an equivalent to the stature of the man, from the crown of the head to the sole of the foot.

By division we obtain the smaller measures: the span is equal to half the cubit, the palm to one-third of the span, and the finger to one-fourth of the palm. The cubit is thus as a measure divided into twenty-four equal parts, with subdivisions of which, two, three, and four are the factors; for the mensuration of distance the foot is found equal to one-fifth of the pace, and one-sixth of the fathom.

However beautiful and simple therefore may be the principle of decimal arithmetic, it has been found entirely inapplicable to a system of metrology. It is impossible by its rules to find the dimensions of those modifications of matter, which are usually bounded by the curved line, or of those artificial vessels, modelled after the circle or the sphere.

But in the progress of human affairs, wants, discoveries and occupations rapidly succeed each other, or go hand in hand, until the multiplied relations between man and man give rise to civil society and established governments. It must soon have been obvious, that there was a very great difference between the weight or specific gravities of equal bulks of different substances. But the use of weights not being necessary to individual or even social man, the discovery of the balance would follow the unavoidable experiments made in the barter or exchange of the productions of the earth.

"Specific gravity, as an object of mensuration, is, in its nature, *proportional.* It is not like measures of length and capacity, a comparison between different definite portions of space, but a comparison between different properties of matter. It is not the simple relation between the extension of one substance and the extension of another; but the complicated relation of extension and gravitation in one substance to the extension and gravitation of another."

It is, therefore, obviously impossible to estimate extension and gravitation by one and the same standard. By an immutable law of nature, they are to be estimated by a different rule, and the only uniformity they admit of is that of *proportion* between their respective standards, and not of *identity*, which would refer them to one and the same unit.

As it is necessary in the use of the balance that there should be employed two substances, each of which is, or would be, the test or standard of the other, we may readily suppose that these would be taken from those most essential to society. Consequently corn and wine have been employed as the substances on which to found systems of metrology. But with the discovery of the metals and their peculiar properties, changes must have taken place in the standard of valuation. For as it would soon be found that they could only be estimated by weight, they would soon be employed as the standards for the weight and value of other things. The different specific gravities of the metals would, however, give rise to another complication and another diversity of weights and measures, since they could not be indiscriminately employed as standards of weight and value for other things.

The common sense of mankind would direct them to the selection of silver as a standard; since it possesses in a high degree those peculiar properties which distinguish this class of substances, and not equally abounding with the coarse metals, therefore of more value, and yet more abundant than gold and some others, and therefore more suitable as the universal medium of exchanges, and capable of being made by the authority of government, money, weight and coin.

The necessity for common and uniform standards of measures will spring from the nature, constitution and operations of civil society. When exchanges take place, every individual will perceive that the diversified measures adopted by each family, would lead to endless confusion and fraud. If the cubit should be assumed by common consent, on the authority of law, as the standard for measures of length, and the pace for that of motion, there will be two standards for measures of length, as was before observed, not reducible to one, because neither is a multiple of the other. But when the discovery is made, that the foot is an aliquot part of the pace for the mensuration of motion, and of the ell for the mensuration of matter, it will assume the rank of a common standard for both, and there will be an advance towards the uniformity of identity. Primitive and individual man then requires measures of length; domestic society gives rise to measures of capacity, of surface, distance, and decimal arithmetic; civil society, government and law are the parents of weights, uniform and common standards, money, coin, and all the elements of uniform metrology.

The reflection suggested by these speculations is, that weights and measures, more or less rude or perfect, were among the primitive inventions of our race. They spring from the nature and the necessities of man, and we naturally turn to the history of those two ancient nations, the Hebrews and the Greeks, from whom the religious, civil and political institutions of civilized Europe and America are derived, for some accounts of their origin. From the writings of Moses, we learn that instruments of brass and iron were invented, at no very distant period from the creation; and though no mention is made of weights, we are told by Josephus, the Jewish historian, that they were invented by Cain, the tiller of the ground and the first builder of a city.

The cubit as a standard measure of length, as well as the use of decimal arithmetic, are of antediluvian origin. The ages of the patriarchs are noted in units, tens and hundreds of years, and Noah was directed to build his ark three hundred cubits long, fifty cubits broad, and thirty cubits in height. In the history of Abraham, after the general deluge and the confusion of languages, we find references to weights and measures. He was a Chaldean, and was very rich in cattle, silver and gold. *Measures* of meal are first noticed in this part of the Bible. Abimelech gives him a thousand pieces of silver. He gives to Hagar a *bottle* of water, and bought of Ephron the Hittite the field of Machpelah, for which he pays him by weight four hundred shekels of silver, current money with the merchant.

At this period, then, we find acknowledged and in common use, measures of length, of land and of capacity, liquid and dry; weights, coined money, and decimal arithmetic. The elements of a system of metrology were complete; but the identity of the weights, coin and decimal arithmetic comprises the only uniformity that is apparent.

In the law given from Sinai, weights and measures are referred to, and the Hebrews are commanded, "just balances, just weights, a just ephah, and a just hin shall ye have;" and again, "thou shalt not have in thy bag divers weights, a great and a small; thou shalt not have in thy house divers measures, a great and a small; thou shalt have a perfect and a just weight; a perfect and a just measure shalt thou have."

These ordinances relate to weights and measures already known and established, and which were probably brought by the children of Israel from Egypt. They require that as a nation, the standards kept in the ark of the covenant or the sanctuary should be perfect; and that individually the people should have weights and measures corresponding exactly with these standards, "and not divers, a great and a small." The cubit was the unit for measures of length, and was divided into twenty-four digits or fingers. It was not divided decimally, and was not used for itinerary measures; these were estimated by paces, sabbath day's journeys and day's journeys. The ephah was the measure of capacity for dry, and the hin for liquid substances. An egg shell was the primitive standard from nature for the latter.

The homer was the largest measure of capacity, and was common both to liquid and dry substances, very nearly corresponding with our wine hogsheads, and the Winchester or London quarter. The intermediate measures were different, and combined in their divisions the decimal and duodecimal numbers.

The weights and coins were the shekel, of twenty gerahs; the maneh of sixty shekels for weight, and fifty for money; and the kinchar or talent of three thousand shekels, both for weight and money. The original weight of the skekel was the same as one half of our avoidupois ounce; the most ancient of weights traceable in human history. The speculative views of the origin of weights and measures are illustrated by this brief sketch of the Hebrew system of metrology. We discover from these sacred records, that measures of length and of distance are derived from the members of the human body; but the first is from the arm, and the second from the leg and foot. That the natural standards for measures of capacity and for weight are also different from linear measures, and different from each other; that the natural standards for weights are not the same, one of which is identical with metallic money:—and that decimal arithmetic, while it is admirably calculated for the standard *units* of weights and measures, is not applicable to their subdivisions or fractional parts, nor to the objects of admeasurement and weight. In the vision of the prophet Ezekiel, this system of metrology is developed, combining the uniformity of identity and the uniformity of proportion. Among the Greeks, too, the cubit was a primitive measure of length, but was superseded by the foot, when the Olympic games were instituted by Hercules.

He fixed the stadium or length of the course or stand at six hundred feet, and this afterwards became the standard itinerary measure of the nation. It was afterwards combined by the Romans with the pace, one thousand of which constituted the mile. These are our standard measures of length at this day. The foot has many advantages over the cubit, not the least of which are that it is an aliquot part both of the pace and the fathom. It has therefore been universally adopted by modern Europe, while the cubit, that ancient antediluvian standard, has been abandoned.

The origin of the Greek weights and measures of capacity is not distinctly known, but it is ascertained that their uniformity was that of proportion and not of identity.

Their weights corresponded as our troy and avoidupois weights, and their measures as our wine and ale gallons; not indeed in the same proportions, but in the proportions to each other of the weight of wine and oil.

Like the Hebrews, they had dry and liquid measures, which were the same, but with different multiples and subdivisions. These measures for wine and oil were determined by *weight*, those for water and grain by vessels of capacity cubed from measures of length.

The Romans derived their weights and measures from the Greeks. They had two pound weights, termed the metrical and scale pound. "The scale pound, says Galen, determines the weight of bodies; the metrical pound, the contents or quantity of *space* which they fill."

Their measures of capacity for wet and dry substances were multiplied and divided differently from the Greeks, but were like them formed by the two different processes of cubing the foot, and testing wine and oil by weight.

The Roman amphora, was the largest vessel for liquids; it contained eighty pounds of water, and being formed by cubing the foot, was called the quadrantal. But any vessel containing ten metrical pounds weight of wine was their congius or unit for liquid measures. The sextarius was the sixth part of the congius, and was used for substances as well dry as liquid. The *pondo* or money pound, and the *libra* or metrical pound, were in the proportion to each other of eighty-four to one hundred, nearly the same as that between our troy and avoirdupois weights.

There is still at Rome a standard congius of the age of Vespasian, and the inscription which it bears states that it contains ten pounds of wine.

It is probable that before the conquest of Britain by the Romans, the Britons had a system of metrology different from that which was introduced by these masters of the world. The yard or *girth* was a measure of Saxon origin, not derived from the foot or forearm of the ancient Greeks or Hebrews, but from the circumference of the body.

The Britons no doubt, however, derived that system from the Romans, which from very early times they are known to have possessed. Its elements, the pound, ounce, foot, inch, and mile, sufficiently indicate its origin. But the *girth* corresponding with the Roman ell or ulna, would, when added to this system, create confusion, and is therefore said to have been finally adjusted by the arm of Henry I. made a multiple of the foot, and thus adapted to the remainder of the system. Whatever may have been the perfection of the Roman metrology at its introduction, there can be no doubt that it suffered considerable changes, during the barbarous ages preceding the Norman conquest, and while the kingdom was divided into the different governments of the Saxon heptarchy.

By slow degrees could any uniformity be introduced, applicable to the whole of a people, so long subject to feudal lords or petty though absolute kings.

William the conqueror, though an unlimited monarch, we are told, attempted no innovation on the existing system of weights and measures, whatever it was.

In his statute on this subject, he says, "we ordain and command that the weights and measures, throughout the realm, be as our worthy predecessors have established." One of the principal objects of the great charter of Henry III. 1225, was to establish uniformity in existing weights and measures, and not to innovate on the usages and customs of the people. The words of the statute are, "one measure of wine shall be through our realm, one measure of ale, and one measure of corn, that is to say the *quarter* of London; and one measure of dyed cloth, that is to say two yards (ulne) within the lists; and it shall be of weights, as it is of measures.

It has been supposed that this statute meant to establish the uniformity of identity and not of proportion, by commanding one measure of ale, wine, and corn. That the unit of all these should be one and the same, and but one unit of weights. But this could not have been the case, or the act would not have referred to the London quarter as an established measure, and one which was never used for wine. But it meant that the wine and corn or ale gallons should bear the same proportion to each other in size, as wine bears to wheat in weight. And that there should be the same proportion between the money and the merchant's weights, as between the wine and corn measures. This construction will be further proved and illustrated by the act called the assize of bread and ale, passed in the 51st of Henry III. 1266. After providing for the price of bread, according to the price of wheat, and the price of ale by that of wheat, barley and oats, it proceeds; that by the consent of the *whole realm* of England, the measure of the king was made; that is to say, that an English *penny*, called a sterling, round and without any clipping, shall weigh thirty-two wheat corns in the midst of the ear; and twenty pence do make an ounce, and twelve ounces one pound, and eight pounds do make a gallon of wine, and eight gallons of wine do make a London bushel, which is the eighth part of a quarter.

In the 31st of Edward I. 1304, this statute was repeated in nearly the same words, though varying them slightly so as to make the meaning more clear. It states that eight pounds of *wheat* do make the gallon; and after enumerating articles sold by the merchant's weight or pound of fifteen ounces, among which are wheat and wine, finally adds "it is to be known, that every pound of money and of medicines consists only of twenty shillings weight; but the pound of all other things consist of twenty-five shillings. The ounce of medicines consists of twenty pence, and the pound contains twelve ounces; but in other things the pound contains fifteen ounces, and in both cases the ounce is of the weight of twenty pence.

These two statutes unfold the theory of the ancient weights and measures of England, and we discover that the system was not one of blind chance, but reduced to a beautiful and harmonious order. The same features are observable in it, that are impressed on the Greek and Roman metrologies. It furnishes two pound weights. One of twelve ounces, to be used for bullion or in the mint, and for pharmaceutical purposes; and, whatever S. F. Gray may think of it, this practice did not originate with the Norman lords, but was probably derived from ancient Greece and Rome, long before William the Conqueror set his foot on the soil of England. The pound of fifteen ounces, like our avoirdupois, was used in all manner of merchandize, including wheat and wine, except gold and medicines, and these pounds bore the same proportion to each other as the weight of wheat bears to that of wine.

The statute has been censured for taking kernels of wheat as the natural standard of weights, inasmuch as they must vary in weight, in different seasons, and even in different fields in the same season. But it must be observed that it takes thirty-two grains of *average* wheat, which were found equal to the silver penny sterling. The numeration of corn was then dropped, and the multiplied weight of the penny was employed to form the pound. A vessel when filled with *wheat* that would balance eight of these twelve ounce pounds, was made the *wine* gallon; and a vessel filled with wheat that would balance a keg containing eight of these gallons of wine, deducting the tare of both, was the *measure* of the bushel. The whole process is simple and beautiful; wheat is made the standard for the weight of silver money, and silver money the standard for the weight of wheat. The weight of wheat is employed to make the wine gallon *measure;* and the *weight* of wine to make the *bushel measure* for wheat. This bushel, divided into eight parts, would furnish a half peck or beer gallon containing a greater number of cubic inches than the wine gallon, because the specific gravity of wheat is less than that of wine, and of course an equal weight will occupy a greater space.

These two gallons however bore the same proportion to each other as there was between the two pounds of twelve and fifteen ounces; the same proportion as between the commercial and nummulary weights of the Greeks, and as there is between our troy and avoidupois pounds.

It appears that, antecedent to the statute of 1266, the wine gallon had been made by dividing the ton of shipping, a process entirely different from that of employing the weight of wheat. In the one case this measure was made by beginning with the kernel of wheat, and multiplying; in the other by taking the ton of shipping, which was ascertained by linear measure, and dividing.

Now the ton of shipping was of thirty-two cubic feet by measure and weighed 2560 of the easterling or tower pounds. By dividing the *weight* of the ton by the *cubic measure*, we find a cubic foot to contain eighty pounds of wine: and this, be it observed, was the quadrantal or amphora of the Romans. The eighth part of this amphora will give the gallon of ten money and eight commercial pounds weight.

A cubic foot contains 1728 cubic inches, and this divided by eight will furnish the gallon above named, containing two hundred and sixteen cubic inches.

But it must be borne in mind that this gallon of two hundred and sixteen cubic inches was in reality a measure for water; it was an aliquot part of the ton of shipping. Our forefathers considered the specific gravities of wine and water as identical; but the wine of Gascoigne, referred to in all these old statutes (the claret of the moderns), was in proportion to water as 9935 are to 10,000.

The gallon of two hundred and sixteen solid inches contained then, it appears, eight commercial pounds of water; but this fluid being of greater specific gravity than wine, a measure to hold the same number of pounds of the latter would be of more than two hundred and sixteen; it would be of 217.6 cubic inches. These then were the dimensions of the water gallon derived from the ton of shipping, and the Bourdeaux wine gallon containing eight easterling pounds of wheat, according to the theory in the statute of 1266.

The standard wine gallons of these dimensions have been lost in the revolutions of the kingdom; but the weights and measures of England were established in Ireland as early as the year 1351. The changes which have occurred in the British system of metrology have not extended to Ireland, at least so as to affect the wine gallon; and it is found that this measure in Ireland is neither more nor less than 217.6 cubic inches. The specific gravity of Gascoigne wine being to that of wheat as 143 is to 175, this Irish gallon of wine balanced against a corn gallon would yield one of the dimensions of 266.17 cubic inches. A corn gallon or half peck, still extant, of the year 1228 was examined by a committee of the house of commons in 1758 and found to contain 266.25 cubic inches. This half peck then and the Irish wine gallon of the present times were both made according to the statute of 1266, and with an accuracy which all the refinements of the present age could scarcely surpass. This system of weights and measures, unfolded more fully in the statutes of Henry III. and his son Edward I., was evidently not introduced by either of these sovereigns. Henry III. was the eighth king of the Norman race, and the act of 1266 was passed precisely two hundred years after the conquest, and was undoubtedly nothing more than a development of the principles laid down in the great charter of 1225 in the same reign. This charter was designed not to innovate; but establish existing weights and measures, and to guard against fraud and oppression.

This system bears a similitude in its general features with that of the ancient Romans, as displayed in the amphora, or cubic foot, containing eighty easterling or tower pounds of wine, and the congius of Vespasian, still extant, holding, like the wine gallon of 1266, ten of the same pounds. The scale and metrical weights of the Greeks, described by Galen, from which the Roman weights were derived, coincide with the old nummulary and commercial pounds of England. The system of the Hebrews, already alluded to, was founded on the same general principles; and thus we find that of Britain may be traced to Egypt and Babylon, those seats of ancient splendour and civilization.

But the beauty and symmetry of this system of weights and measures was first defaced by Edward I. himself, by debasing the coin, and thus destroying its identity with the money weight. His successors completed its ruin by an extension of the same practice, and by confounding the pennyweight troy with the silver penny sterling.

For more than five hundred years the pound had been coined into two hundred and forty of these pennies, one of which was equiponderant with thirty-two grains of wheat in the midst of the ear.

In the year 1328 Edward I. coined the same pound into two hundred and forty-three pennies of the same standard alloy. The penny thus lost for ever its *sterling* weight, though it retained the name. Edward III. increased the number of pennies in the pound to three hundred, or twenty-five shillings, and thus rendered it equivalent to only twenty-five and three-fifths kernels of wheat, instead of thirty-two. These short-sighted monarchs probably did not perceive that they were thus taking away the key-stone to that beautiful and compact fabric on which the happiness and prosperity of their people so much depended. But such was the fact, and the evil is irremediable.

The standards made after the statutes of 1266 and 1304, and kept in the royal exchequer, finally became injured or destroyed, and called for renovation.

Henry VII. in 1494, after the cessation of the civil wars of York and Lancaster, undertook to furnish forty-three of the principal cities with copies of the standards in the exchequer. For some cause not known, these all proved to be incorrect, and they were accordingly ordered to be returned, and parliament attempted to provide a remedy for the evil at the next session in 1496.

This statute unfolds a theory for weights and measures which produces very different results from those of the acts already so often referred to. It ordains "that the measure of the bushel contain eight gallons of wheat; that every gallon contain eight pounds of wheat, *troy* weight, and every pound contain twelve ounces of troy weight, and every ounce contain twenty *sterlings*, and every sterling be of the weight of thirty-two corns of wheat that grew in the midst of the ear, *according to the old laws of the land;*" and the new standard gallon after the said assize, was to be made to remain in the king's treasury for ever. This statute was evidently designed to be a repetition of the act of 1304, but it is very obvious that it differed widely from it.

The tower pound and troy pound were to each other as fifteen to sixteen; the penny *sterling* therefore, was one-sixteenth lighter than troy weight. But in 1496 the pound was coined into thirty-seven shillings and six pence, and the penny sterling had ceased to be a coin, though it was still money. It, therefore, weighed little more than half what it weighed in 1304, and instead of balancing thirty-two grains of wheat, would at this time have only been equal to seventeen of these grains.

The pennyweight troy was never called a *sterling* at any time but in this statute of 1496.

It is therefore plain, that the parliament mistook the pennyweight troy for the penny sterling, and introduced this Norman weight into the composition of the gallon and bushel, instead of the old tower or Saxon pound. The gallon made by this process, as the troy weights are heavier than the others, would be larger than that of 1266. But as the bushel is ordered to *contain* eight gallons of wheat, instead of containing a *weight* of wheat equiponderant to eight gallons of wine, it will necessarily be much smaller than that of 1266. If a bushel ever was made by this process, it never was used as a standard. The measure of the gallon furnished by this statute was two hundred and twenty-four cubic inches; and held eight pounds troy of wheat, and eight pounds avoirdupois weight of Bourdeaux wine of two hundred and fifty grains troy to the cubic inch.

It is a question in the history of English weights still undecided, at what time the troy and avoirdupois pounds, with their subdivisions, were introduced and made the legal standards.

The names of both indicate a French origin; but William the Conqueror made no alteration of the kind, and from the acts of 1266 and 1304, more than two hundred years afterwards, we ascertain that they were *then* unknown in the law or trade of England. It is stated by Clarke, one of the most learned writers on the coins, that they were introduced by Henry VII. in 1496, and that it was to pay a compliment to the dutchess of Burgundy, and facilitate the exchange between Flanders and England, then established by the *intercursus magnus* or great treaty of commerce. It appears, however, that the employment of the troy weight in the statute of 1496 was not done with the design to innovate; the object was to arrive at the size of the gallon, &c. "*according to the old laws of the land,*" i. e. of 1266 and 1304. Besides, this treaty with the Flemings was not concluded until the year after the passage of the statute.

From statutes of 1414 and 1423, in the reigns of the fourth and fifth Henry, it appears that the troy weight was then known and used by the goldsmiths, a fact which proves that Henry VII. did not introduce this weight, but mistook it for the tower or easterling pound. The troy weight was not used at the mint until the 18th of Henry VIII. 1527, as is shown by a verdict of that date remaining in the exchequer, in which are the following words: "and whereas heretofore the merchant paid for coynage of every *pounde towre* of fyne golde weighing eleven ounces quarter troye, two shillings and six pence. Nowe it is determined by the King's highness and his said councelle, that the aforesaid pounde towre shall be no more used and occupied; but all manner of golde and sylver shall be wayed by the pounde troye, which maketh twelve ounces troye, which excedith the pounde towre in weight three quarters of the ounce."

Gray, in his Essay on Weights, in alluding to the provisions of magna charta, "that there should be one weight, one measure, and one quarter of coin in the realm," observes that "the Norman lords unquestionably understood by this the French troy weight, to which they and their agents were accustomed, though the people, no doubt, considered the avoirdupois to be that entitled to this distinction." He further states "that in 1267, the 51st of Henry III. the first positive attempt was made to change the *common weight* into the troy, under the name of the weight of assize; and twenty of the silver pennies then current, being in good condition, so as to counterpoise thirty-two grains of good wheat, were declared to be an ounce."

If the statements made in the preceding pages of this essay be correct, these remarks show that the author of the "Elements of Pharmacy" was not familiar with the early history of the English weights. In the first place it has been proved that the statute of 1266 provided for the use of the tower or esterling pound, which was one-sixteenth lighter than troy; and the Norman lords understood perfectly well what was meant by it and so did the people. Neither the troy nor avoirdupois weights were intended to be, or were introduced by the provisions of magna charta or the statutes of Henry III. and Edward I. There can be no doubt, however, that the troy weights were introduced under the Norman dynasty. The foreign commerce of England began to flourish in the reign of this same Edward I. and in 1296 two celebrated mercantile societies, one of them natives of Lombardy, had their origin and were incorporated with a special charter of privileges from Edward. According to Hume, these Lombards soon became the goldsmiths and bankers of England; their weight was the troy weight, and by them the probability is that it was introduced. The pound of fifteen ounces or seven thousand and two hundred grains troy weight, may be traced to them also. It was designed to accommodate the weights to the old English rule of two pounds; one of twelve for drugs and gold, and the other of fifteen ounces for all other things. But this pound was never made a legal standard, though it was used in many parts of England under the name of the merchant's weight. Gray complains very heavily of the conduct of the Normans in thus attempting to force upon the nation the weight of Troyes in Champagne as preferable to their own. It certainly is much to be regretted that the old tower or easterling pound was supplanted, and with it all the beauty of the ancient system. But it was brought about by a concurrence of circumstances, over which it appears the Norman kings had as little control as they had over the elements. He inveighs against sir Theodore Turquet De la Mayerne, compiler of the London Pharmacopœia in 1418, for ordering the apothecaries to dispense by troy weight, instead of the avoirdupois which had previously been used in dispensing. Now it is altogether probable that the avoirdupois, as respects England, is of no more ancient date than the troy weight.

This gentleman calls it "the Roman weight, the commonest weight in use, and therefore, without doubt, the most ancient." Of its antiquity there can be no doubt, as I have stated the half ounce avoirdupois to equipoise the Jewish shekel; and therefore, for aught we know, this weight is of antediluvian origin. But its being the commonest weight in use only shows that it has completely supplanted the merchant's pound of fifteen ounces, which corresponded with the twelve ounce tower pound, and was a part of the system of 1266. The practice of dispensing drugs by one weight (a small one) and buying and selling all other merchandize by another (a larger one), we have seen was of more ancient date than the introduction of the troy weight.

In recommending this to the apothecaries, sir Theodore only obeyed the custom of ages, and alluded to the troy weight as the one recognized by law. The avoirdupois weight ought to bear as much blame as the troy, for it was evidently introduced by the Normans, and probably about the same time, under the particular sanction of those same Lombardy merchants, and as a part of their system of metrology.

The first use made of the word "*avoirdupois*" is in a statute of the 9th Edward III. 1335, which is also the first authority for these *merchant strangers* to buy and sell corn, wine, fish, *avoirdupois*, flesh, and all other provisions, victuals, &c.

Eighteen years afterwards (1353), in another statute, the word *avoirdupois* occurs again, applied to merchandize, and complaints are alluded to, that these foreigners bought by one weight and sold by another, that was smaller. The statute therefore says—"We therefore will and establish that one weight, one measure, and one yard be throughout the land," &c.

Now it is manifest that the word *avoirdupois* was originally applied to all weighable articles, (toutz manerz des choses poisablez), the expression of these statutes; and also, that the one weight, one measure, &c. applied to the old merchant's weight of fifteen ounces, between which and the weight of these merchant strangers there was a difference.

The weight of these foreigners was obviously the avoirdupois; corresponding with their troy weight, a part of their system, *none* of which was yet recognized by law. The old pound of fifteen ounces contained six thousand seven hundred and fifty grains troy; the avoirdupois pound seven thousand grains troy. A difference of nearly half an ounce was large enough to induce these foreigners to sell by the small legal weight of England, and buy by their own, the avoirdupois. Taking the lead in mercantile pursuits, these Lombards gradually introduced this weight, and in the 24th of Henry VIII. 1532, a statute directs that beef, pork, mutton and veal, shall be sold by weight "*called haverdupois*;" the very use of which expression, *called* haverdupois, indicates that the term was of recent origin, as descriptive of the weight, and that the weight itself had not long been in general use. Thus the troy weight was first used in 1496, for the composition of the gallon and the bushel, and was afterwards introduced at the mint by Henry VIII. in 1527, supplanting the old tower or easterling pound of twelve ounces. And the avoirdupois, it is equally evident, was brought to England about the same time, by the same merchant adventurers, and was legalized by the same Henry VIII. in 1532, as the commercial weight corresponding to the troy pound.

The tone and temper in which the essay on weights in our third number is written, is far from the true standard of philosophical courtesy. Philosophers are, or ought to be, citizens of the world; their common aim to instruct and benefit mankind; and they should bring their gifts to the altar without a disgusting display of national vanity, much less of national bitterness.

It is difficult to discover the reason for appropriating to drugs a specific weight, or to drugs and bullion the same weight; but it appears to have been a custom of very early times; and as the Normans did not introduce the weights of 1266, we may take it for granted it was not an innovation of theirs. It is lamentably true that, as S. F. Gray observes, a trade in which the utmost precision in weights is usually expected, is actually that which is the most inaccurate in that respect. It is altogether probable, however, that the twelve ounce pound of the tower, originally, and of troy after its introduction, with their subdivisions, were altogether used in those days by the apothecary, not only in compounding but in selling simple medicines. But the apothecaries of this country now compound by troy, and buy and sell by avoirdupois weight. There is a difference of near ten per cent between these weights, therefore they must estimate in prescriptions that the articles are at cost when they have added ten per cent to the actual price paid for them by avoirdupois weight. But if they retailed articles by the half pound or pound troy, they would be gainers in a larger proportion. By the use of the avoirdupois weight in selling pounds and half pounds, the apothecaries have lost the important feature of the plan as respects their interest, and have, moreover, created the confusion in their shops of having two sets of weights employed on their counters. Whether this departure from the ancient practices and acts of parliament originated in subsequent statutes, or in a gradual assimilation of the apothecaries to the customs of other trades, cannot be very easily determined. The appropriation of a specific weight to medicines is a part of the Spanish metrology, and probably of other countries as well as England and the United States. The small divisions of the avoirdupois weights are not now employed, and the brass sets made for the apothecary are a compound of the two; the troy weights beginning at the lowest division of the series, and terminating at the fourth of an ounce, where the avoirdupois commences and is carried to the pound.

The troy and avoirdupois weights, then, were originally introduced by the Lombards; and the first sanctioned by law in 1496, when it was introduced in the composition of the gallon and bushel. It has been stated that the wine gallon thus made was of two hundred and twenty-four cubic inches in dimensions. It is necessary to state that the confusion of this statute by the use of the troy weights, and the employment of the term penny *sterling* for pennyweight troy, produced also another wine gallon containing two hundred and thirty-one solid inches. As the gallon of two hundred and twenty-four cubic inches was to hold eight troy pounds of wheat, thirty-two kernels of which weighed a pennyweight troy, every kernel, on the average, was one-sixteenth heavier than that wheat which had been used for the composition of the gallon and bushel of 1266, thirty-two kernels of which were equal to the silver penny sterling, which was one-sixteenth lighter than troy weight. The average kernel being specifically heavier, a pound weight of it occupied less space; on the other hand, the corn of lighter kernel would require a greater number of grains to make up the same weight. The gallon of 1496 was to contain 61,440 kernels, weighing in the aggregate eight pounds troy; and they would fill a space of two hundred and twenty-four cubic inches. To make the same weight, eight pounds troy would take 65,280 kernels of the wheat of 1266; but these 65,280 kernels would fill a space of two hundred and thirty-one cubic inches. The difference between the two was a compound of the increase of numbers, and the diminution of weight. It has also been stated that this statute of 1496 ordered the bushel to *contain* eight gallons of wine, instead of directing it to be made by the *weight* of eight such gallons. This never was made, as it would have contained only 1792 cubic inches, instead of 2146, the size of the Winchester bushel; a measure which has always been regarded as very near the true standard, according to the old laws and long established customs of the people. But by a statute of Henry VIII. 1531, it was ordained that a bushel be made by the principle of the *compositio mensurarum* of 1304. That is to say, that it contain the *weight* of eight gallons of wine. But the gallon used in the composition of this bushel was of 231 cubic inches, and the bushel, to balance, filled with wheat, eight such gallons of wine would be equiponderant to sixty-four avoirdupois pounds, and measure 2256 cubic inches. The eighth part of this measure is the gallon of 282 cubic inches, which was for a long time the standard ale and corn gallon of England, and is to this day, of the United States.

In the reign of queen Anne, after a law suit between the officers of the customs and an importing merchant respecting the size of the gallon measure, an act was passed, "declaring that any round vessel, commonly called a cylinder, having an even bottom, and being seven inches in diameter throughout, and six inches deep from the top of the inside to the bottom, or any vessel containing 231 cubic inches, and no more, shall be deemed and taken to be a lawful wine gallon."

Thus in the attempts to solve the difficulties that have from time to time occurred in their weights and measures, the successive parliaments of England have multiplied the measures bearing the same name, and have introduced two weights unknown to their ancestors, until every vestige of the beautiful uniformity of proportion has entirely disappeared. By a statute of 1816 the standard gallon, both for liquid and dry goods, was ordered to contain ten pounds of pure water at the temperature of 56½ degrees of Fahrenheit's thermometer, and be of the measure of 276.48 cubic inches. That all measures of capacity be taken from this standard in certain parts, multiples and proportions: viz. a *quart* shall be one-fourth of said gallon; a *pint* the half of such quart; and there shall be two such gallons in a *peck*, and four such pecks in a *bushel*. It further ordains that the standard of weight shall be the pound *avoirdupois:* the same being equal in weight to 27.648 cubic inches of pure water at the temperature of 56½ degrees of Fahrenheit; that all measures of weight shall be taken in parts, multiples or certain proportions of the standard pound avoirdupois, viz. fourteen of such pounds make a stone, &c. and then dividing, each pound to contain sixteen ounces, each ounce sixteen drachms, each drachm three scruples, and each scruple ten grains. By this process the uniformity of proportion is utterly demolished, and the uniformity of identity adopted according to the new French metrology.

One standard measure of capacity is made the unit for all substances thus measured, liquid and dry; and one weight the unit for all substances estimated by gravity. The proportion of uniformity between the specific gravities of wheat and wine, or wheat and spring water, between the troy and avoirdupois weights, and again between the weights and measures of capacity, make neither part nor lot of the arrangement.

It would have been well for succeeding times, after the troy weight was used in the composition of the gallon, and the avoirdupois as the merchant's weight, if the statute of 1496 had never been misunderstood, and continued down to the present day. These weights are in the proportion to each other of the specific gravity of wheat and spring water.

The wine gallon of 224 cubic inches contained exactly eight pounds avoirdupois of wine. A pint of wine was a pound of wine.

The corn gallon of 272 cubic inches, which corresponded with it, contained eight pounds of wheat. A pint of wheat was a pound of wheat, and the bushel of 2176 inches contained sixty-four pounds avoirdupois of that wheat, thirty-two kernels of which weighed a pennyweight troy.

But under this statute of 1496, two sets of measures, both for wine and wheat, were introduced, and the mode has been explained by which it was accomplished.

These were, the wine gallons of 224 and of 231 inches, the beer or corn gallons of 272 and 282 inches, the bushels of 2176 and of 2256 cubic inches.

The standard measures of Pennsylvania, as used at the custom house of Philadelphia, are the wine gallon of 231, and the beer gallon or half peck of 282 cubic inches; a copper half bushel, containing 1093.1 cubic inches, making the bushel 2186.2 solid inches, and holding of Schuylkill water seventy-eight pounds twelve ounces avoirdupois, and of wheat, thirty-two kernels of which are equal to the pennyweight troy, sixty-six pounds two ounces avoirdupois. The weight is the pound avoirdupois, equal to 7000 grains troy. In the different custom houses of the union this weight falls below in some, and rises above 7000 grains troy in others.

The wine and corn gallons mentioned above are still in the same proportion to each other as the troy and avoirdupois weights, but neither of them is in any useful proportion to the bushel. The troy and avoirdupois weights are with all the exactness that can be desired standards for each other: and the cubic foot of spring water weighs exactly 1000 ounces avoirdupois, which makes the ton of thirty-two cubic feet measure exactly 2000 pounds avoirdupois in weight.

My apology for the length of this article must be the nature of the subject. It appeared to be impossible to compress it more, without such an abridgement of facts as would destroy the interest and render it obscure. In a future number I shall present a view of the new French system of weights and measures, a system which has challenged the admiration of the world; symmetrically beautiful in all its parts, the offspring of accomplished genius and profound learning, yet, as experience has proved, not perfectly adapted to the nature of man and the physical world.

The system unfolded in these pages originated, probably before the dawn of science, in the rude attempts of the barbarian to supply his own wants. It was gradually perfected as the necessities of society and the light of knowledge increased, and in different nations assumed different forms, though still displaying the same leading principle in all—the uniformity of proportion.

In the British statute of 1266, it was brought to a degree of theoretical and practical perfection that left little to be desired. Six centuries of conflicting and inconsistent legislation have laid it in ruins.

The present system of England bears little or no similitude to that from whose ashes it has sprung. Our own retains more of the traces of antiquity, and in my opinion is not the less useful or beautiful for retaining unimpaired some of its original features.

Selected Articles.

On the Blue Colouring-matter of Lapis Lazuli, and on Artificial Ultramarine. By Dr Fr. W. Schweigger-Seidel[*].

The mineral colour known by the name of Ultramarine, esteemed for its beauty and durability, especially in oil-painting, has long been an object of chemical inquiry. The lapis lazuli, from which the colour is obtained by careful washings, is procured from Asia (partly through the East Indies, partly by way of Orenburg), where it is found in Little Bucharia, Thibet, several provinces of China, and Siberia[†]. It seems to have been known to the Romans under the name of sapphire, as appears from some passages of Pliny[‡]. But the production of ultramarine seems not to have been invented till the end of the fifteenth century; the name of *Azurrum ultramarinum* (the origin of which is very evident) is said to have been first used in the year 1502 by Camillus Leonarius[§]. It once formed a considerable article of trade in Italy, where this colour was probably first produced, and even now the greatest quantity, and that of the best quality, comes from there.

---

[*] From the *Jahrbuch der Chemie*, &c. N. R. Band xxii. p. 206.

[†] This is different from the lazulite or *copper lazure* (Armenian stone) which owing to the similarity of their colour used formerly to be mistaken for it; hauyn seems to be more nearly related to lapis lazuli.

[‡] *Hist. Nat.* lib. xxxvii. 38, 39.

[§] Leuchs's *Farben-und Färbekunde*, ii. 198.

Whether it be in consequence of a lessened demand, and consequent diminished manufacture since the discovery of prussian blue, and other cheaper blues, or in consequence of a diminished importation of the lazure-stone, that this colour has become so very scarce, this much is certain, that its high price (an ounce of the best quality being said to sell now at from one hundred to two hundred francs*) has greatly limited its use; whilst formerly, especially in the sixteenth century, it was almost wasted by painters, as is proved by many pictures of that period.

The value of the colour naturally led to a desire of producing it artificially. Some assert, that the art was known in the sixteenth century, but kept secret. But this probably implied only the art of obtaining ultramarine of the best quality from the lazure-stone. What are called artificial lazure-stones, for the production of which there are many formulæ†, are in fact artificial pieces of glasses coloured with some metallic oxide (mostly oxide of cobalt), which will of course yield no ultramarine. Indeed the colour of lapis lazuli was generally ascribed, until lately, from the results of chemical analysis, and according to analogy, from a metallic oxide (oxide of cobalt, copper, iron, &c. supposed to be contained in it). Wallerius derives it from silver‡, which, however, has not been found by any modern chemist, and which was probably only believed to be it through a well-known mistake usual in former times. The common opinion, however, was, that the blue colour of the mineral was produced by oxide of copper, until it was shown by Marggraf, that the lazure-stone contained oxide of iron only, and no oxide of copper§. It was his analysis which gave the first explanation of the component parts of this stone; for the accounts of Rinmann and Cronstedt are not sufficiently defined. Klaproth's subsequent analysis[*] generally confirms the results of that of Marggraf, except that he points out a portion of alumina which the latter overlooked; for the rest, he also inclined to the opinion that the blue colour was produced by the oxide of iron. It was Guyton de Morveau who first drew public attention to a portion of potash contained in the lazure-stone, and which he thought accidental, but considered that it was chiefly the sulphur it contained which, combined with the iron, produced the colouring matter of the stone[†]. This view, however, was refuted by Clement and Desormes, who proved that the ultramarine contained sulphur, but no iron[‡]; which conclusion was confirmed by the experiments of R. Phillips, on the methods of ascertaining the degree of purity of the ultramarine[§]. Clement and Desormes at the same time mentioned a considerable proportion of soda in the ultramarine, which also seemed to contain some potash[||]. These two chemists, however, express no opinion as to the cause of the blue colour. Thénard, indeed, does not deny the possibility of a coloured body being produced by the combination of colourless bodies, but adds that the loss of 0·8 per cent, experienced by MM. Clement and Desormes in their analysis, might lead to the supposition that it was just the colouring substance which had escaped them*. Phillips expresses the opinion that the lazure-stone perhaps owes its colour to a peculiar substance *not metallic*, and recommends this part of the subject to the attention of chemists†.

---

* Leuchs's *Farben-und Färbekunde*, p. 205. Thénard *Traité de Chimie*, tom. ii (618) p. 210.

† Compare some of them in Leuchs, p. 487.

‡ *System. Mineral.* i. 312.

§ See his Chemical works, vol. i. p. 121—134, and Hochheimer's *Chem. Minéralogie*, vol. i. p. 239—244.

---

[*] See *Beiträge*, &c. vol. i. p. 180—196, and Schweigger's *Journal*, vol. xiii. p. 488. xiv. p. 581. and xli. p. 234. He found silica and alumina, carbonate of lime, sulphate of lime, and oxide of iron.

[†] Compare Scherer's *Journal* (1800), vol. iv. p. 659, and more at large vol. v. p. 709; also *Ann. de Chimie*, xxxiv. p. 54, and Von Crell's *Chem. Ann.* 1801, p. 467: he notices the following substances as appearing accidentally in various quantities in the lazure-stone,—carbonate and sulphate of lime, and at times even barytes.

[‡] Gehlen's *Journ. für Chem. u. Phys.* vol. i. p. 214—221, and *Ann. de Chim.* March 1806, tom. lvii. p. 817—364. Compare also *Journ. des Mines*, xvii. (No. 100) p. 822; and this (Schweigger's) *Journal*, vol. xiii. p. 489; vol. xiv. p. 831, and vol. xli. p. 235.

[§] Vol. xli. of this (Schweigger's) *Journal*, p. 233—241. Comp. also Annals of Philosophy, No. 51, July 1823, p. 31. The methods of examination are given here with mountain blue, prussian blue, indigo, smalt, and oxide of cobalt, although we may venture (as Phillips says at p. 239) to declare an ultramarine as genuine, which in a few minutes "(developing sulphurous acid gas, especially on being heated)" loses its colour when an acid is poured on it, leaves an insoluble dirty white residue, and forms a colourless solution.

[||] They at least saw crystals of alum, like Guyton de Morveau. They found no sulphurous acid gas, and even carbonate of lime does not always appear; but always sulphur in connexion with soda, alumina and silica, which therefore must be considered as the essential components of the ultramarine.

With this difference of views on the nature of the colouring-matter in the lazure-stone, scarcely any result could be expected from the experiments instituted for producing ultramarine artificially; indeed they were all unavailing. An interesting accident, however, had led to a probable hope of the result ultimately turning out advantageously. M. Tassaërt, superintendent of a manufactory of sulphuric acid and soda, found, on breaking up the hearth of one of his smelting furnaces for soda, in the foundation of it, a blue substance which as long as the hearth had been built of brick, and not of sandstone as it was then, he had never noticed‡. Vauquelin on examining this substance found it greatly to resemble the lazure-stone, and the analysis also indicated alumina and silica united with soda and sulphite of lime, but at the same time with iron and sulphuretted hydrogen, from which latter components, in connexion with alkali, Vauquelin felt inclined to deduce the blue colour of this substance as well as of the lapis lazuli§.

---

* See his *Traité de Chimie*, 1e A. tom. ii. p. 208; and Schweigger's *Journal*, vol. xli. p. 236.

† In this (Schweigger's) *Journal*, vol. xli. p. 239.

‡ According to a verbal communication of Dr Weissner, the administrator Herrman at Schönebeck had made a similar discovery some years ago, and declared the substance to be an ultramarine produced by a chemical process. Perhaps we ought also to add to this the blue colouring-matter which at times dyes the calcined potash a beautiful lazure blue, and which has been usually attributed to metallic oxides or finely divided carbon.

§ Compare this (Schweigger's) *Journal*, vol. xiii. Old Series, p. 486, &c. and vol. xiv. p. 388. *Ann. de Chim.* tom. lxxxix. p. 88. Thenard, tom. ii. p. 748. Fechner, ii. p. 418.

Soon after L. Gmelin examined a volcanic product thrown out by Vesuvius, which Breislak (in his *Voyages dans la Campanie*) mentions as a seventh kind of lazulite, and which was afterwards classed by Bruun Neergard with the hauyn*. Nevertheless this mineral seemed to agree in its external characters more with the lapis lazuli than with the hauyn, which induced L. Gmelin to repeat the analysis of lapis lazuli at the same time, and to compare the results of these analyses with those he had recently obtained from the chemical investigation of the hauyn†. The result was, that the blue volcanic product above mentioned had in reality a great similarity with the lazure-stone even in its chemical composition. But the same observation was also applicable to the hauyn, which seemed to differ from the lazure-stone, essentially, only by a proportionately great quantity of sulphuric acid, and by its containing potash instead of the soda found in the lazure-stone. The latter, however, was also the case in the blue volcanic mineral, by which the latter seemed again more closely related to the hauyn than to the lapis lazuli, or at least to form an intermediate link between the two minerals. This induced L. Gmelin to arrange the lazuli, containing soda, with the hauyn, containing potash, as species or subspecies nearly allied, but to consider the blue mineral, under the name of *earthy hauyn*, as a mere variety of the common, called *granular hauyn*. In other respects the volcanic product differs from the two other substances by containing a considerable proportion of iron: L. Gmelin, however, also found iron in the lazuli, and he would not have been disinclined to take the colouring principle for protosulphuret of iron, had not Clement and Desormes shown that there is no iron in the ultramarine.

Almost at the time when Vauquelin's and Gmelin's investigations of substances resembling lazulite‡ (which evidently were indebted for their existence to chemical processes nearly related,) raised the possibility of an artificial production of ultramarine almost to a certainty, without, however, giving any clear explanations respecting it, another German chemist (who has not only enriched the science in so distinguished a manner, but also the arts by a number of ingenious investigations) found in quite a different way an indication of the colouring-matter in the lazuli, and he would have required but little further investigation to become perfect master of the artificial production of ultramarine.

---

* *Journ des Mines*, No. 125.

† *Observationes Geognosticæ et Chemicæ de Hauynâ*, &c.

‡ See this (Schweigger's) *Journal*, vol. xiv. Old Series, p. 325—335, where at p. 331 a tabular view is given of the analyses here alluded to. Let it also be

By the communication of some experiments on the fuming sulphuric acid, which were published in the year 1815 in this (Schweigger's) journal*, Dœbereiner developed his views on the composition of sulphur, as consisting of hydrogen and a probably metallic body (*schwefelstoff*,) whence he felt inclined to deduce the blue colour of Vogel's blue sulphuric acid. "And if," concluded this able chemist, "the colour of the pure sulphureous substance is really blue, the colour of the ultramarine seems to be solely produced by this substanee; and that from potash or soda, sulphur, silica and alumina, under certain conditions, a blue similar to the ultramarine, only less brilliant and beautifully clear, may be produced, I have shown a year ago to Professors Gehlen and Schweigger. I have been withdrawn from this investigation by other occupations, but shall soon again devote myself to it, and communicate the results." He, then, was the chemist who for the first time pronounced the colouring principle of ultramarine to be sulphur.

Unfortunately Dœbereiner has not again pursued his beautiful discovery: it is therefore the more satisfactory that the fact is now confirmed in many journals, with the intelligence which, no doubt, will please the practical chemists, that another of our most distinguished German chemists, Professor C. G. Gmelin of Tubingen, has succeeded in the discovery of a proper chemical process for the production of ultramarine.

---

observed that Gmelin found traces of potash besides the soda in the lazuli, and 2 per cent of magnesia.

* Vol. xiii. Old Series, p. 476—484.

We cannot conclude this review more suitably than by a verbal transcript of the following account from the *Berliner Hand und Spener'sche Zeitung*, (10th April 1828,) No. 84, and which in substance seems to be from the distinguished inventor himself.

"*Tubingen.*—Prof. C. G. Gmelin, who for some time past has been employed in the investigation of ultramarine, has arrived at the conviction that sulphur is its colouring principle, and particularly that there is no metal, properly so called, entering into its composition. Gmelin had received some ultramarine from Paris eighteen months ago, but which, according to the opinion of M. Seybold, the artist at Stuttgard, was not of the best quality. In order, therefore, to obtain ultramarine of all kinds, and to determine by strict analysis what proportions of its component parts are most favourable to the production of its fiery colour, he addressed himself months ago to Prof. Carpi at Rome. During a short residence he made in Paris, in the spring of 1827, he expressed it as his opinion to the chemists of that metropolis, especially to M. Gay-Lussac, that ultramarine, with the investigation of which he told them he was then engaged, might be produced artificially. It is perhaps, therefore, his own fault if another (M. Tunel of Paris, who wishes to keep his discovery a secret) has anticipated him in this respect. The process by which, according to M. G.'s inquiries, the production of ultramarine is always successful, is the following:—Procure silica containing water and alumina; calculate how much a given weight of these earths will leave after being calcined. (By Gmelin's investigations 100 parts of hydrous silica contained only 56, and 100 parts of hydrous alumina only 32·4 parts of pure earth.) Next, dissolve as much of the hydrous silica as can be dissolved in caustic soda, and calculate the quantity of earth used. Add now to 72 parts of this silica (calculated as free from water) 70 parts of alumina (also calculated in a state free from water); add the latter to the silicate of soda, and let it evaporate, stirring it all the time till the residue presents a damp powder. (One may also take at once 60 parts of dry caustic soda to 72 parts of alumina obtained from alum, the latter being reduced to the dry state.) This colourless mixture of silica, soda, and alumina, is the foundation of the ultramarine, which is to receive its blue colour. For this purpose, melt in an earthen crucible, well closed, a mixture of two parts of sulphur and one part of anhydrous carbonate of soda, and when the mass is properly melted, throw very small portions of the first mixture at once into the middle of the crucible: as soon as the effervescence produced by the rising of the aqueous vapours has ceased, throw in another portion, and so on; and keep the crucible, when the whole mixture has been introduced, for about one hour in a moderate red glowing heat (if the heat is too great, it destroys the colour); when cold, pour water into the crucible, and separate by means of it the brown residue of sulphur mixed with the ultramarine. A superabundance of sulphur may be expelled by a moderate heating. If the colouring is not of an equal intensity, the most fiery ultramarine (and this is a very important circumstance) may be obtained by washing, and separating it from those parts which are less coloured. From the component parts of the ultramarine as given by the analysis, it cannot be formed, without a medium. Thus this colour is nothing else than a silicate of soda dyed with sulphuret of sodium.

"The natural ultramarine contains a not inconsiderable portion of potash and sulphuric acid; and it is very probable that the artificial production here mentioned may be usefully varied, but this can only be discovered by experiment."

Observations and Experiments upon the Kusia or Koosia of the Indians,—the Bitter Cucumber, Momordica operculata of Linnæus. By John Hancock, M.D.

This plant, the fruit of which forms, perhaps, the most active hydragogue purgative in nature, is indigenous upon the sandy shores of the Essequebo and in various parts of the interior of Guiana; yet it had never been known as a remedy, nor at all noticed in the colony, so far as I am aware, till the year 1821, when, from its extraordinary bitterness and analogy to momordica, I was induced to make trial of it medicinally. Since that period I have employed it with the most satisfactory results, more especially in general dropsy, leucophlegmasia, mal d'estomac, cachexy, and weakened sluggish state of the organs of digestion.

The plant is a scandent vine, having altogether the *habit* and *facies* of the *Cucumis sativa* or common edible cucumber. In the Linnæan system it belongs to the *Monoecia Monadelphia*, natural order *Cucurbitaceæ*.

The root is fibrous. The stem is five-angled, five-channeled, climbing to the summit of the highest trees, or trailing extensively over the surface of the ground. The leaves are distant, angular, obscurely five-lobed, roughly pubescent, on long channeled petioles. The tendrils at the base of the petioles are long, divided and spiral. The flowers are yellow, the males borne in clusters upon a long common receptacle; the females solitary, elevated above the germ upon a stout columnar receptacle, which grows and becomes the lid or operculum of the capsule. The petals of the corolla, in both males and females, are about thrice the length of the calyx, obovate, spreading, obtuse. In the males, both the calyx and corolla are deeply cleft, or joined at the base only. In the female calyx, there are five acute leaflets, which are quite distinct and distant. In all these respects, its disparity with the assigned characters of *elaterium* or *momordica* will be apparent. The antheræ, as in most of the kindred genera in this natural order, are five in number, cohering, borne upon three filaments. The stile is cleft. The germ large, angular, swelling into an oval, trilocular, prickly, brown and dry *capsule*, rather than a *pepo* or *pomum*, as stated in botanical works.* Willdenow therefore says of the fruit "intus absque pulpa, siccus." The fruit, indeed, appears, in respect to its envelope, almost as much the capsule, as in *Papaver*, *Bixa*, or *Sparmannia*, and, like the former, sheds its seeds at the insertion of the pistillum. This is mentioned merely to show a similarity in respect to the external pericarp, and for no further analogy. The lid falling, discovers within a white three-celled reticulum or web-like substance, lying loose, or but slightly attached to its envelope. This web† is exceedingly bitter, and one of the most active cathartics in nature. It forms the true receptaculum of the seeds, which are black, compressed, and numerous. The albumen is pregnant with a sweet bland oil. Willdenow says the fruit is green, "fructus viridis," &c. Like most other fruits, it has a green colour before maturity: it then rapidly turns brown and dry.

It would seem that the locality or habitat of this plant had never been known or defined; for Linnæus, and all the later botanists, have, after Commelin, referred it to America, which is a wide field for research, if a botanist wished to identify the plant, as they do not point out any particular part of that vast continent where the plant is to be found. In fact, the little that is known of it, appears to rest solely on the authority of Commelin, who has given the figure of the plant,‡ if it be the same species.

The words of Commelin are, "Mom. Americana, fructu reticulato sicco. Ex fibrosa et parva radice, sarmenta proveniunt tenuia, viridia et *rotunda.*" In his figure also, it appears as a round stem. Of the embryo, he observes, "Qui tandem excrescit oblongum, turbinatum et echinatum: hic per maturitatem fungosus et retis instar perforatus est, in quo semina continentur, oblonga, plana et nigricantia." In a section of the ripe fruit, the web or reticulum is represented as having six lobes and six corresponding cells, and is apparently sprinkled with black dots.*

---

* In the whole order the fruit is a pepo, but this becomes dry and fibrous in several *when ripe*.

† I call it a web for brevity, and it seems to me the most expressive term I can find for it; the fruit being neither a cucumber, an apple, nor a gourd, but a capsule enclosing a light web or reticulum.

‡ V. Plantæ. rar. Commelini, T. 22. Possibly, however, it may be growing in some of the botanical gardens here, as seeds of the plant were sent to Scotland a few years since from Essequebo.

The Kusia, however, has usually only three cells, most rarely four, but never exceeds that number. The stem, instead of being round, has five acute angles. Besides, our author has neither figured, or made any allusion to the operculum, which constitutes its most singular and striking character. It appears to me, therefore, not improbable that we have two distinct species confounded under the same names of *Momordica operculata;* but this we cannot decide, being uncertain whether Commelin's description be correct.

For the plant here described, the native name Kusia or *Koosia* as a trivial one may be most convenient, the Linnæan (if it be *M. oper.?*) being too long, I had almost said too barbarous, for frequent repetition. Knowing no English name, I had called it Bitter Cucumber; but this name is appropriated to the *Cucumis agrestis* of Linnæus; besides, the *Koosia* is neither properly a pepo nor pomum, but a dry trilocular capsule, not bursting, but having a deciduous lid at the apex. In this respect it differs widely from *M. Elaterium*, which is a succulent cucumber bursting at the base, and ejecting its juice and seeds in a peculiar manner. *M. cylindrica* has also a dry capsule, and I believe several of this genus have the same, whilst other species bear juicy, spongy cucumbers, more or less like elaterium. I expect that the modern revolutionizing botanists have in many instances parted genera on much slighter grounds of difference than are observable in the genus *momordica*.

---

* The Cucurbitaceæ have all a three-celled pepo, but several have the appearance of six cells from the alternate position of septa and several receptacles. See this structure well illustrated in Dr Hamilton's paper, Trans. R. Soc. Ed. Vol. xi. part i. which see.

In respect to the fruit of the Cucurbitaceæ, authors, we find, differ much as to the structure observable in the several genera; but it certainly does differ greatly in this natural order. Authors represent those of the genus *cucurbita* to be a pepo with from three to five or six cells. *Sicyos*, monospermous; in *Bryonia*, a berry; in the genus *Elaterium* a *capsule unilocularis*, 2 ad 3 valvis, Decandolle; in *Erythropelum* of Blum. *unilocularis, trivalvis.* Cucurbitaceæ 1 *S. multilocularis*, Persoon. *trichosanthes* 1? 3-9 *locularis* Decandolle, Prodrom. pars. iii.

The web or reticulum of the fruit, which usually weighs about six or eight grains, is the active part. The seeds and the outer shell or capsule are inert; yet, as somewhat of the active part may adhere to the seeds and shell, I have generally employed the whole fruit.

I have paid no attention to the chemical affinities of this substance. On cutting the green fruit, I have observed that it blackens the knife, from which I judge that it contains much gallic acid. If there be such a thing as a *bitter principle*, this assuredly presents it, for it is one of the bitterest of known substances. In this respect, the quassia bears no comparison with it. The web, agitated in water, gives out much froth like soap.

As to its *modus operandi*, I may observe, that, whilst it evacuates the intestines, it unloads the cellular system of serous deposit, unburdens and accelerates the circulation, has much effect in glandular and visceral obstructions, in improving digestion and rousing the alimentary functions. This no doubt is partly owing to its potent bitterness, for we find the infusion very bitter, although in the proportion only of one grain of the decorticated portion or web (which is a common dose) to a tumbler full of water.

For the first two or three years I used the koosia alone, or without any other adjunct; but, finding the infusion, which seemed in some respects preferable to the tincture, to spoil very soon, I entered upon a long series of experiments for finding a preservative which should at the same time moderate its actions upon the stomach, as being liable to promote vomiting. After trying various acids, alkalies, oils, sugar, neutral salts, &c. I could find no advantage was gained, excepting in the combination with common salt or cream of tartar, by either of which adjuncts the infusion would not only keep for many months, but its operation was considerably milder on the stomach, and with more certainty directed to the bowels, so, indeed, as very materially to improve the remedy, seldom causing vomiting in the common dose (one grain) unless the stomach be foul.

In this way, two of the capsules put into a quart or porter bottle, with a tablespoonful of common salt, half filled with boiling water, shaken several times, and afterwards filled up with boiling water to the neck, and agitated several times while cooling, will make an infusion, of which from half a wine-glass to a glassful, or from one to two ounces, may be taken for a dose, according to the patient's strength and habit of body. If the fruit should be deteriorated by age or moisture, a larger dose may be required, which in this form will be easily ascertained by trial.

It may be prepared in the same manner with the supertartrate of potash; but, as a larger portion of water is required to dissolve this salt, I have usually prepared it with four times the quantity of water, and, consequently, a quadruple dose of this was given.

The first of these preparations is the most convenient and equal in all respects to the second, as an ordinary purgative; but, in dropsical cases, the second (*i. e.* with super. of potash) may be preferable. With either, however, patients express their astonishment at the quantity of water carried off by stool, even when they have drank nothing for the whole day, or for the preceding twenty-four hours. It is not a little amusing to hear the negroes discussing this subject at times among themselves. I have heard them remark, that the water was sucked up out of all their skin—by all the skin meaning the whole body. Notwithstanding its extreme bitterness and the nausea it will often occasion, I have observed them fond of taking it in many cases, as, when they are really ill, they esteem a medicine the more highly when it *works them off well, as they call it.* When not so, any thing will do as a placebo.

With an additional teaspoonful or two to the dose of cream of tartar in either of the foregoing preparations, it forms a most potent hydragogue cathartic, diuretic and sudorific, especially if taken warm. In smaller doses it is a very capital alterative and stomachic. Its use, whether in full or alterative doses, is usually followed by much increase of the appetite. The patient should be covered warm, and lie still in bed. It usually acts with much effect on the skin, bowels, and kidneys; in short, on the whole system. For delicate stomachs, the addition of liquorice renders it much less offensive.

I have always found it best to give this remedy at one draught as a cathartic; for, according to my experience, it does not act well in divided doses, as directed with elaterium; and, notwithstanding its activity, there is nothing to be feared from a full dose, for, should the evacuation prove excessive or harassing to the patient, it is immediately controllable by a small dose of opium, with the use of barley-water, starch glysters, with tincture of opium if required. This I have proved from trials made on purpose, for I never had actual occasion for it. In the fluid form, in which it is exhibited, it is certain of being rejected when taken in an over-dose; and, if the extract of elaterium were or could be given in this way by infusion, it is probable that purgative would seldom be found to operate with too great violence, as often reported of it.

When a full dose of the bitter infusion is taken, the patient should lie down and remain tranquil for an hour or two, in order to prevent vomiting, and should be provided with a flat basin to enable him to spit without raising his head and shoulders, by which means he will, in a great measure, avoid the disagreeable nausea which is apt to attend the medicine. With this precaution it will seldom cause vomiting. Although exciting, however, no sensible nausea, it will augment the flow of saliva, and indeed it appears to promote the secretion of mucus or slimy fluids in the alimentary canal along its whole course.

I have commonly repeated the dose in ascites after three or four days, according to the strength of the patient, and have also given it in universal dropsy with complete success, even in the most forlorn cases. It should be commenced early, however, to give it a fair chance of success. In the advanced stage more caution is requisite.

I must here observe, that, when it is not early perceived to produce favourable effects, as reducing dropsical swellings, &c. I have usually found a gentle mercurial course to be attended with the most decided advantage, and that, both by its own proper agency, and as a preparatory, or as reducing the system of the patient to a condition susceptible of the action of other remedies.

I am aware that mercury is often employed by practitioners in dropsy, but upon too limited and narrow views, being restricted, by a capricious dogma, to those cases only which appear to depend on a diseased state of the liver. Many who have observed the efficacy of mercury in dropsy, who have a servile deference for fashionable though often absurd maxims of pathologists, and who shape their practice upon what they conceive established and unerring principles, may be observed racking their brains to make out some affection of the liver, so as to get a plea for prescribing mercury; the oracles have taught them that mercury is to be resorted to in dropsy, only when the functions of the liver are disordered; and thus is the healing art fettered, in thousands of instances, by the dogmas of physic.

According to my experience, there is no tribe of diseases in which mercury, under proper management, is more generally advantageous than in dropsies; but it appears to me to be equally so whether the liver be diseased or not. In some cases I have found it necessary to repeat salivation, and even to employ paracentesis withal.

In a most obstinate case of ascites and general dropsy, which occurred about two years since in a black woman, (Frankey,) on plantation Better Success, Essequebo, I found it requisite to draw off the water by tapping eight or nine different times, and to salivate her thrice. When I left the coast, she had been several months at her work, hale and strong, without the smallest symptom indicative of a relapse. In this case the kusia held only a subordinate place in the cure; and this case is cited rather as an instance of the failure of the remedy singly employed, and to indicate the additional means which were resorted to with complete success. Decoctions of the bark of *Amyris Juribali* and ginger were also given to restore the strength during and somewhat prior to convalescence. The kusia alone, however, has often effected cures in the most forlorn cases of general dropsy.

Its effects by glysters, in procuring operation in dry belly-ache, exceed any thing I have yet tried. It causes some sickness at the stomach at times, but less than when taken by the mouth; yet it appears to empty the whole canal, attended, perhaps, with a less secretion of water.

I have also employed it by enema with happy results, in two cases of enlargement of the spleen, one of which was in my own person about three years since. This swelling arose during the progress of an ardent fever, which was succeeded by an intermittent; and both the fever and painful swelling were removed by four or five enemas of kusia.

To prevent its too ready action on the lower intestines, the injection should be very dilute, as one web to a quart of water, of which from four to six ounces may be injected, and repeated as may be requisite. A little soap and sweet oil is a useful addition as emollient and sheathing. In this mode, employing it cautiously, in small quantities, and at distant intervals, I am disposed to think it may prove a potent resolvent in cases of obstruction and enlargement of the spleen, perhaps of the liver and other viscera, prepared as already noticed.

In 1825, I gave some of the fruit of the kusia to Drs Robson and Allen, who effected several cures of dropsy with it in Demerara; and they several times sent for further supplies. Dr Robson, who has come home to settle in Scarborough, can give his own account of it. This is the only reference I can make to any medical testimony on the subject. Being, however, so abundant that cart loads of it could soon be collected in Essequebo in the months of March, April, and May, experiments with it may easily be instituted on a large scale, as in hospitals especially.

I may conclude with a few remarks on the officinal elaterium. I had some samples of it sent out to Demerara, which were all widely different in power, some being almost inert. This I thought arose from the strange mode directed for their preparation. The active principle in kusia is soluble both in water and spirit: it would seem not to be so in elaterium, if we may draw an inference from the mode of preparation directed by the colleges. That of the Edinburgh college seems to me quite unintelligible.* If the active part be at all soluble in aqueous menstrua, then a large portion must be lost, *i. e.* thrown away in the supernatant liquor or juice, besides what must remain in the pulp when but slightly pressed. Hence the minute portion of extract obtained and its extravagant price.†

"From Dr Clutterbuck's experiments, it appears that the quantity of elaterium is so small that only six grains of it are procured from forty cucumbers. Dr Paris found that ten grains of the best elaterium, as it is found in the shops, contains only one grain of elatine; and he observes, that in general it is adulterated with starch, on which account we scarcely ever obtain two samples of it of the same strength."—L. C. p. 765.

---

* This, however, it appears from an observation of Dr Thompson, is now abolished: "It is very remarkable that the Edinburgh college has rejected so important a remedy from the last edition of its Pharmacopœia." London Dispensatory, p. 766.

† From a subsequent consideration of the subject, it appears that the active principle in elaterium is not soluble in water, as in some pharmacopœias, (as that of Van Mons. &c.) the fecula is directed to be washed, *well washed* in water, by which it plainly appears neither to be soluble in simple water nor its own proper juice. This insolubility in water indicates its resinous nature, which may in some measure account for its acrimony and drastic operation on the bowels; on the contrary, the active principle in kusia being soluble in water, may account for its greater mildness of operation.

The fructus kusia has the advantage of uniformity in point of strength and activity, if gathered about its maturity, and kept from moisture, and it admits of no adulteration. Each web containing on an average about seven grains or seven full cathartic doses, presents a great contrast with that just cited of elaterium.

It may here be observed, that the common *extractum elaterii* of the shops, so variable and uncertain in power, is in general, however, found to act in a dose of from half a grain to two grains, *i. e.* in about the same quantity as the *web* of kusia by infusion. An ounce of the extract will cost in the shops about £3 sterling, according to Mr Gray's Supplement to the Pharmacopœias. The web of kusia need not cost more, I should suppose, than 4*d.* or 6*d.* the ounce, containing at least an equal number of doses. This may be considered a great advantage to the poor, although it may be said they stand more in need of food than physic.

The elaterium of the shops, indeed, from the roughness and extreme uncertainty in its operation, has by many, and perhaps with reason, been considered a medicine not unattended with danger.—*Edin. Med. and Surg. Jour.*

Review.

Traité des Moyens de reconnaitre les Falsifications des Drogues Simples et Composées, et d'en constater le Degré de Pureté. Par A. Bussy et A. F. Boutron-Charlard. Paris, 1829. *Pp.* 506, 8*vo.*

This is a work of great interest and research, and we propose accordingly to present our readers with a copious analysis of its contents. The authors state, that owing to the political circumstances by which France has, at different eras, been isolated from other countries, frauds and sophistications of drugs are more common there than in any other country. "It was particularly," say they, "during the wars of the republic, and the establishment of the continental system, that the arts of sophistication were cultivated. The French ports being shut against foreign merchandise, the imperial government thought itself bound to encourage the use of succedanea: books were written to make known to France her own riches in this respect; and whether from enthusiasm or novelty, most of the productions of the Indies were soon replaced by articles of French growth. The most precious virtues were ascribed to substances until then regarded as worthless. The bark of the horse chesnut, the rhubarb of Morbihan, the poppy and the woad of our southern departments, were proposed as substitutes for the cinchona of Peru, the rhubarb of China, the opium of the Levant, and the indigo of Bengal.

We then saw Marseilles transformed into a great workshop of frauds; gum resins, resins, balsams, manna, castor, opium, musk, were no longer any thing more than clumsy sophistications, which, if they did not exercise a fatal action on the animal economy, were at least inert. "Although since that period political events have restored the freedom of trade, and re-established our communications with foreign powers, the sophistications have survived the prohibitive system which fostered them, and have even received a new impulse from the progress of modern chemistry; a progress which has been seized to profit by these falsificators, and has rendered it more difficult to detect their frauds."

The increasing commerce in drugs with France renders a knowledge of these sophistications important to our countrymen; and we shall therefore prepare an abstract of such passages as appear to us interesting, without much further comment. We shall only observe that the work is not a mere account of sophistications, but is replete with practical information respecting the qualities and properties of medicinal substances.

Acetic acid.—A curious property of this acid may lead to a great error in estimating its strength.

The purest acid that has hitherto been obtained contains an eighth part of water. In this state it is solid at 60° Fahrenheit, and its specific gravity is 1·063. By adding water until it forms a third part of the pure acid, the specific gravity is increased to 1.079. An additional quantity of water reduces the specific gravity, so that we cannot trust to the hydrometer alone in estimating the strength of strong acetic acid.

Acid benzoic.—This acid is in its purest state when obtained by subliming the crystals formed by Scheele's process. It must be remarked that the acid obtained by sublimation from the benzoin is supposed to derive some of its medicinal virtues from the empyreumatic oil it contains. In subliming Scheele's acid we obtain but about one half the quantity employed.

Benzoic acid is obtained from the urine of herbivorous animals, in which it exists in the state of benzoate of soda. It presents itself in the form of beautiful white plates, which betray a urinous odour—and should always be rejected.

Acid citric.—This acid is sometimes mixed with large crystals of tartaric and oxalic acids. The experienced eye will always recognize these admixtures, which are readily detected by the precipitate which they form with a concentrated solution of hydrochlorate of potassa. A deposition of granular crystals and bitartrate or binoxalate of potassa is thrown down when these acids are present, while the pure citric acid does not trouble the transparency of the solution. Where a dilute solution of suspected acid is submitted to examination, dry acetate of potassa may be substituted to advantage for the hydrochloric solution.

Acid hydrochloric.—The density of this acid is sometimes increased by the addition of salts, the presence of which may always be known by evaporation.

Sulphuric acid may be readily recognized by the addition of baryta water, which forms with it a perfectly insoluble precipitate. Sulphurous acid is a more common adulteration, and is always present when the fire is pushed too far at the close of the distillation. It communicates a peculiar penetrating odour to the muriatic acid, which may easily be recognized. In order to discover it, saturate the suspected acid with baryta water, and treat the washed precipitate with sulphuric acid, when fumes of sulphurous acid will speedily manifest its presence.

The presence of iron may readily be known by the addition of a few drops of the solution of ferro-hydro-cyanate of potassa. The yellow colour of hydrochloric acid is not a sure indication of the presence of iron; but is sometimes caused by the presence of iodine or bromine. To ascertain the strength of this acid, dilute a given weight of it with two or three times its weight of water, and ascertain the quantity of carbonate of lime (powdered marble) which it will saturate. Multiply this quantity by 0.74, and we shall have the quantity of real acid employed.

Acid hydrocyanic.—The process of Vauquelin, who decomposes a solution of one part of cyanide of mercury in eight parts of water by a hydrosulphuric acid, is recommended as the most uniform preparation in regard to strength.

Table of the Density of Various Mixtures of Water and Hydrocyanic Acid.

Hydrocyanic Acid	Water	Sp. Gr.
1	0	0·70583
1	1	0·90355
1	2	0.91608
1	4	0·97825
1	5	0·99679
1	9	0·99807

Nitric acid.—To ascertain its strength neutralize with powdered marble, and multiply the quantity of marble requisite for this purpose by 1·08.

Acid sulphuric.—Nitric and nitrous acid cannot exist in concentrated sulphuric acid, unless added after concentration for the purpose of whitening the acid; for they would be driven off by the heat necessary to concentrate it. They may always be discovered by heating that acid.

Sulphate of lead may be detected by a solution of hydrosulphate of ammonia.

Ammonia.—The presence of empyreumatic oil may be detected by slowly mixing with a great excess of sulphuric acid, which will blacken it. Hydrochlorate of ammonia sometimes comes over in preparing ammonia. To discover it, saturate with nitric acid, and add nitrate of silver. The presence of sulphuric acid may be discovered by saturating with nitric acid and adding baryta water.

Angustura bark.—The true Angustura bark has an animalized odour. "There are parcels of true Angustura in which this odour is slight; but we have met with others in which the smell was so decided that it resembled that of fish."

Reagents.	Aqueous Infusion of true Angustura Bark.	Aqueous Infusion of false Angustura Bark.
Tincture of litmus.	Colour destroyed.	Little or no change.
Sulphate of iron.	Abundant light gray precipitate.	Slightly turbid bottle green colour.
Hydro-ferro cyanate of potassa.	No precipitate at first. Hydrochloric acid forms at length a very abundant yellow precipitate.	Slightly turbid. Hydrochloric acid does not increase the precipitate; the whole assumes a greenish hue.
Caustic potassa.	With a great or small quantity the liquid deepens into an orange with a greenish hue and precipitates. Nitric acid restores the original colour.	A small quantity gives a bottle green colour, a larger quantity a deep orange with a greenish hue. The liquor remains transparent. Nitric acid added slowly restores the green colour, and finally that of the infusion.

In addition to these characters it may be added, that a drop of nitric acid on the internal surface of the false Angustura forms, after two or three minutes, a deep blood-red spot, caused by the brucine. A drop of the same acid placed on the external surface of the lichens which cover the bark, becomes of a deep emerald green. Neither of which happens to the true Angustura.

Minutes of the College.

At a meeting of the Philadelphia College of Pharmacy, held December 8th, 1829, it was resolved that the President and Secretary be directed to arrange and digest the Laws of the College as they now exist.

January 26, 1830. The following communication was read from the corresponding secretary:

To the Philadelphia College of Pharmacy.

Gentlemen:—As corresponding secretary of the College of Pharmacy, I have to perform the painful duty of announcing to you the death of M. Vauquelin, a foreign honorary member of this institution. The loss of this great chemist, who contributed so eminently to the advancement of chemistry, will be deeply felt by the lovers of this science. He died in the course of last November, of a severe and lingering disease. He was director of the Parisian School of Pharmacy, Professor of Chemistry at the Royal Garden, Member of the French Academies of Science and Medicine, and of the Royal Society of London, &c.

Your's, most respectfully,
E. DURAND.

A report from the President and Secretary, appointed in December to arrange and digest the Laws of the College, was read; and, with some amendments, was adopted.

The following gentlemen, proposed at a former meeting, were duly elected foreign members of the college.

M. Brandes, Director of the Pharmaceutical Society of Northern Germany, Salzuffen in Lippe Detmold, Westphalia.

M. Doebereiner, Professor of Chemistry and Pharmacy in the University of Jena.

M. Sertuerner, Apothecary in Hamlin, Hanover.

M. Tromsdorff, Apothecary, and Professor of Pharmacy, Erfurt, Prussia.

M. Hermbstedt, Professor of Pharmacy in the University of Berlin, Prussia.

March 30th. The Publication Committee made their annual report for the past year, which was read and accepted.

A report from the Treasurer was read, accompanied by an account current for the past year, and referred for examination to a committee.

The College next proceeded to the annual election, when the following gentlemen were duly chosen.

President,—Daniel B. Smith.

Vice Presidents,—Samuel Jackson, M.D., Henry Troth.

Secretary,—Charles Ellis.

Treasurer,—Edward B. Garrigues.

Trustees,—Alexander Fullerton, Jun. Warder Morris, Peter Lehman, Charles H. Dingee, Samuel C. Sheppard, Joseph Reakirt, John Carter, William Marriott.

Trustees elected in September last,—Benjamin Ellis, M.D. Algernon S. Roberts, Charles Schaffer, Jun. Samuel P. Griffitts, Jun. John Price Wetherill, Samuel F. Troth, George B. Wood, M.D. William Hodgson, Jun.

Publication Committee,—Benjamin Ellis, M.D. George B. Wood, M.D., Daniel B. Smith, Charles Ellis, Samuel P. Griffitts, Jun.

Miscellany.

Non-existence of Chinoidine.—In the fourth number of our first volume, we published a short account of some new alkaloids, reputed to have been discovered in cinchona bark by the celebrated German chemist Sertuerner. We find in the Journal de Pharmacie for March 1830, an account of some researches made by MM. Henry, fils, and Auguste de Delondre in order to separate and identify these interesting substances.

These gentlemen state, that previously to the publication of Dr Sertuerner's discovery, they were endeavouring to ascertain the causes which prevented the crystallization of the last portions of the mother-waters in the manufacture of sulphate of quinia.

These new alkaloids (of which *chinioidia* was the principal) were represented by their discoverer to bear the same relation to quinia and cinchonia that narcotine bears to morphia in the native compound. The French chemists were stimulated therefore to prosecute their inquiries with zeal, as this discovery appeared to solve their difficulty, and present, in an insulated form, a substance hitherto found inseparable and intractable. But instead of a new alkaloid, they only recognized quinia and cinchonia, united with yellow resinous matters, which prevented the crystallization, and which they separated more or less completely by several processes, following as closely as possible the means pointed out by Sertuerner in the short account he published of his experiments. From these experiments, five in number, and doubtless conducted with every attention to exactness, these distinguished chemists conclude—

1. That there is no doubt of the non-existence of *chinioidine*, and that it is nothing more than a modification of quinia and cinchonia united and rendered uncrystallizable by a peculiar yellow matter. These modifications cease when, after much time and care, they were able to separate or destroy it, and cause the alkalies to crystallize.

2. That the yellow resinous matter which accompanies quinia much more than the cinchonia, appears greatly to change their properties. They separated this substance, but were unable to collect it again by itself, at least very imperfectly; but it appears to differ materially from the yellow colouring matter of cinchona, which is fixed by alumine and oxides of lead and tin.

3. That it is especially on the crystallizations that it exerts the most influence.

4. And that the most certain means of depriving the mother-waters of it are by the addition of turpentine, precipitation and solution in acids frequently repeated; finally, concentration and cold.

Animal Charcoal as a Remedy in Glandular Affections.—Some of the German physicians, particularly Drs Weise, Wagner and Gumpert de Posen, have employed this substance with some success in glandular and schirrhous affections. From the results of their trials, these gentlemen are induced to consider animal charcoal as possessing the *resolvent* powers of iodine and mercury, without the same injurious consequences to the system. As this remedy may come into use in this country, we subjoin the following formula for its preparation.

Preparation of Dr Weise's animal charcoal. Take two parts of beef or mutton deprived of fat and cut into pieces, and one part of bones well bruised. Mix and torrefy them on a gentle fire until a small flame is perceived around the apparatus, after which the heat must be continued a quarter of an hour. After they are cold, reduce to powder the carbonaceous residue, and preserve it in a well closed bottle. Dr Weise prescribes six parts of this powder with one of sugar, to be given morning and evening in doses about the bulk of a pea, (in weight two grains,) in a little water.

This preparation of carbon contains much less phosphate of lime than ordinary animal charcoal, and is therefore more easily operated on in a covered crucible.

Since the discovery of iodine and bromine in burnt sponge, physicians have been disposed to attribute to the former ingredient especially its activity as a medicine in the removal of scrofulous affections. But it appears from the experience of the German physicians, that carbon of itself may be accounted a powerful therapeutical agent.

For its convenient exhibition the French physicians suggest the following

Pastilles of Animal Charcoal.

Take—Charcoal of Weise	1oz.
White sugar in powder	8oz.
Mucilage of gum tragacanth	qs.

Make pastilles of the weight of ten grains, each of which will contain about one grain of the charcoal.—*Journal de Chemie Medicale, &c.*

Copaiva.—M. Planche presented to the Society of Pharmacy of Paris, a mixture of balsam copaiva and calcined magnesia, which manifested very little of the taste of the copaiva, and when scented with the oil of canella, lost all taste except of the latter substance. Finding that a mixture of one part of calcined magnesia with sixteen of copaiva was not solidified in a month, he made another with one part to seventeen of the balsam, but this also failing to assume a proper consistence at the end of the same time, he formed a mass of equal parts of these materials, and it was then he first remarked the loss of taste, and thought the phenomenon interesting. Several members spoke of their results in attempting to solidify copaiva, some of which were negative and others affirmative. The explanation of these contradictions is not yet satisfactory.—*Journal de Pharmacie, Feb.* 1829.

On Styrax or Storax of Bogota. By M. Bonastre.—We find in the Journal de Pharmacie for February 1830, a short account of this substance, which we offer to our readers. M. Bonastre speaks of it as having been only recently carried to Paris, and not yet in abundance. It comes from South America, and is found in the province of Santa Fé de Bogota, whence its name. It flows abundantly by incisions from a tree belonging to the genus *Styrax*, *Linnæus;* but the species is not well determined. This substance is met with in orbicular masses, a little flattened, from twelve to eighteen lines in thickness, and from five to six inches in diameter. Externally it is of a reddish colour, internally opake; the consistence is firm, very dry, though difficult to pulverize; the powder is of a reddish white. When cold it is almost destitute of odour, but when warmed, as by the hand, it diffuses an agreeable aroma sweeter than benzoin, and resembling a little that of vanilla. The odour cannot be confounded with those of the balsams of Tolu and Peru. It breaks with difficulty under the teeth, and does not impart any bitter taste.

Thrown on burning coals it exhales a pungent odour, in common with substances containing benzoic acid, but this fragrance is less agreeable than that of benzoin and styrax calamita, owing to the quantity of ligneous matter found in it.

Cold alcohol takes up all the properties of this species of styrax, and affords a solution of a deep red colour, which shows by reagents, that it contains a large quantity of acid. Its taste is pungent, slightly bitter, resembles that of the tincture of benzoin, and its odour weak. Evaporated to the consistence of an extract, and the latter dissolved in water, crystals of benzoic acid were deposited as it cooled. The residue treated with boiling water, containing some subcarbonate of soda, afforded, when filtered, a liquid of a reddish shade. Muriatic acid added to this when cold, occasioned the precipitation of numerous crystals of benzoic acid. These crystals, purified by charcoal and sublimation, were in the form of beautiful, brilliant white needles, of a very acid taste. The remainder was a solid resinous substance, of a very deep red colour.

This styrax therefore ranks with the true balsams, since it contains

1. Benzoic acid.
2. An odorous soluble resin.
3. A little bitter extractive.
4. And ligneous matter.

The Radical Metal of Magnesia.—In 1828 M. Woelher published a process for separating the metallic base of alumine by the decomposition of the chloride of aluminium with potassium. M. Bussy was led by analogy to attempt the extraction of glucinium and magnesium, the radical metals of these earths, by the same process. In this he was successful, and read a memoir on the subject to the Royal Academy of Science in January 1830.

The chloride of magnesium was prepared as follows:

Take equal parts of starch and calcined magnesia, mix them well with water, and divide the mass into small pieces, which subject to strong calcination in a crucible exposed to the open air.

This mixture is to be placed in a porcelain tube, through which a current of chlorine is passed, and the heat elevated to redness. After some time the chloride of magnesium, which is fixed and fusible, runs along the tube and solidifies at the extremity. It is in the form of a white chrystalline mass, slightly flexible, and presenting in its fracture large brilliant scales. Water dissolves it; the taste is bitter and piquante, and it attracts moisture from the air.

Preparation of magnesium. Take a tolerably strong glass tube, about half an inch in diameter, and from eighteen to twenty inches in length, curved at one extremity. Introduce into the curved part five or six pieces of potassium of the size of a pea, and into the strait portion the chloride of magnesium, between the pieces of which are to be placed fragments of porcelain, to prevent this compound, when in a fused state, from coalescing into a mass. The strait division of the tube is now to be heated, and when brought to a dull red colour, the curved portion is to be made hot, in order to vapourize the potassium it encloses. This occasions a lively incandescence, which is diffused throughout the tube. The contents of the latter, when cold, exposes white metallic globules disseminated throughout the undecomposed chloride. When this mass is treated with water, hydrogen is disengaged, owing to some remaining potassium; at the same time flakes of magnesia separate by the decomposition of a portion of chloride of magnesium, by some potassa regenerated; and brilliant globules are precipitated to the bottom of the vessel, having the lustre and whiteness of silver. These are to be separated by decanting the liquor and washing them several times.

Properties of magnesium. This metal has the whiteness of silver, is very brilliant and malleable, flattening under the hammer, fusible at a low temperature, unalterable in dry air, but losing its metallic lustre in a moist atmosphere, by contracting a coating of white oxide. This effect, however, is confined to the surface of the magnesium. When small fragments are heated, they burn with scintillations like iron wire in oxygen gas; while larger fragments are slowly and with difficulty converted into magnesia. Pure water deprived of air has no action on this metal, but when carried to ebullition, some bubbles of hydrogen are disengaged.

Certain substances favour singularly the decomposition of water by magnesium; and the acids diluted attack the metal with a disengagement of hydrogen. It does not form an amalgam with mercury without the assistance of heat, and a very small quantity is sufficient to deprive mercury of its fluidity.

Agitated in glass vessels, this amalgam becomes covered with a metallic coating, similar to the amalgam of bismuth.

Kermes Mineral.—We find in the Philosophical Magazine for May, a short account of the composition of kermes mineral by M. Gay Lussac, taken from the Annales de Chimie et de Physic, tome xlii. p. 88. He remarks that according to the latest researches of M. Berzelius and M. Rose this compound is nothing more than a common sulphuret of antimony, deriving its colours from its minute division. Not satisfied with the proofs of this composition, he made some experiments, an account of which is contained, with their results, in this paper. He observes "I shall distinguish the precipitates formed by sulphuretted hydrogen, in a solution of antimony from kermes, properly so called, because their natures are different.

The orange red precipitate, obtained by passing sulphuretted hydrogen into a solution of emetic tartar, is an hydrated protosulphuret of antimony. In fact neither weak muriatic acid nor tartar separates any acid from it; and when solution is effected it is always accompanied with the disengagement of sulphuretted hydrogen.

Sulphuretted hydrogen produces also a red precipitate in the permuriate of antimony, but it differs from that obtained from tartar emetic or the protomuriate; it is an hydrated persulphuret, which heat decomposes into sulphur, and which is a volatilized and black protosulphuret like the preceding. The black sulphuret obtained by calcining the orange red sulphuret is less fusible than the native black sulphuret; it resists the action of a spirit lamp.

It is well known that kermes varies in colour according to the mode adopted in preparing it. My observations will be made upon that obtained by the process of Cluzel (Annales de Chimie, tome lxiii, p. 122). We shall be greatly deceived if we suppose that kermes is pure only when it ceases to yield something to water, after numerous washings; for if we were to wash subacetate of copper, and many other salts, till water ceased to dissolve any portion of them, they would be completely decomposed. The fact is the same with respect to kermes; too much washing alters its nature. At what point then ought we to stop? This is readily discovered by employing the smallest possible quantity of water in the washings, and in continuing them only until the residue, supposing the water to have no chemical action upon it, contains only one thousandth or a ten thousandth of foreign matter. Kermes mineral, thus washed, has the following properties: Dilute muriatic acid, tartaric acid, and bitartrate of potash, take protoxide of antimony from it, without disengaging sulphuretted hydrogen; when dried for a long time at seventy and even two hundred and twelve degrees, it still contains water; heated by a spirit lamp it becomes black and yields water, which, as observed by M. Robiquet, is slightly ammoniacal. At a high temperature it fuses and swells up, on account of a little sulphurous gas which is disengaged.

When in layers upon glass it gives it a deep red colour, and rubbed upon paper it gives it a reddish brown colour; it is more fusible than the black sulphuret obtained by the calcination of the hydrated orange sulphuret. If a current of hydrogen be passed at a low red heat over kermes deprived of moisture by heat, much water and sulphuretted hydrogen are obtained, and the antimony is reduced; but, as observed already, the residue possesses an alkaline reaction.

After these various experiments it is unquestionable that kermes contains oxide and sulphuret of antimony, and it ought to be considered as an oxisulphuret. The quantity of water obtained by decomposing it with hydrogen is variable; but it may be considered as composed of one proportion of protoxide of antimony, and two proportions of protosulphuret. In fact I obtained 0.9 of the proportion of protoxide, and M. Henry, by another process, found the proportion still less.

It is equally certain that kermes mineral precipitated from the alkaline sulphuret which held it in solution, is an hydrate. It loses water gradually as the temperature is raised, and appears black when deprived of it; but in my experiments I did not obtain a definite proportion.

When potash, soda, or their carbonates, act upon black sulphuret of antimony, their oxygen goes to antimony, with which it forms protoxide, and the sulphur of the antimony takes the place of oxygen of the alkali. Thus it is that no kermes is obtained by boiling sulphuret of antimony with sulphuret of potassium saturated with sulphur; but by means of acid, a yellowish orange precipitate is formed in the solution, which, when heated, yields sulphur and becomes black. The golden sulphuret gives a similar result.

Vesicating Insects.—M. Farine states, that after many comparative trials on the cleopteres, he has ascertained that the *mylabris cyanescens* follows the cantharides in the vesicating properties of this tribe of insects, and that the *mylabris variabilis* is next in activity.

Those inhabiting warm places have more power than those found in opposite situations.

The blistering property is also unequal in the two sexes: thus in the *meloe majalis*, the male is always more rubefacient than the female, and all things being equal, this insect killed immediately, has more activity than if preserved alive, even if it be but for a few hours. Often also, in the insects of the same genus, one species will be vesicating and another not. Thus the *meloe autumnalis* is less rubefacient than the *majalis*, the *meloe reticulate* still less, and *tuccia*, although living in the same localities, and taking the same aliments as the *majalis*, has scarcely any activity at all. The *ripiphorus bimaculatus* et *flabellatus* are destitute of activity, whilst the *ripiphorus subdipterus* is slightly epispastic, the *zonatis præusta* is inert, and the ——— *punctata* is sensibly active.

The moment of copulation appears to be that in which some of those insects possess the greatest degree of epispastic powers. Thus M. Farine, in separating two of the *meloe majalis* when thus united, ruptured them, and caught a drop of fluid on his hand which raised a blister, while a single insect only produced a slight redness.

He therefore advises that these little animals should be collected during the season of their amours, since then they have the greatest rubefacient power, are in greater numbers, and more easily taken. Localities well exposed to the sun should be preferred, and they should be immediately deprived of life by plunging them in pyroligneous acid.—*Journal de Pharmacie, May* 1829.

Formula and processes for several Plaister Cloths, by M. Beral, Pharmacien.—In the Journal de Pharmacie for August, 1829, we find some processes different from those employed in this country, for preparing compound plaisters, to be used in the dressing of issues and as epispastics.

These plaisters are spread either on paper, linen, or silk.

No 1. *Issue Plaister:*

R.—Burgundy pitch	3 parts,
White wax	3 parts,
Yellow resin	2 parts.

Liquefy these substances in a proper vessel, and pass them through linen. Spread a thin coating on white vellum paper, strong, and sized, by means of a knife or machine. The emplastic tissue is very adhesive, and yet sufficiently consistent to prevent the leaves from sticking together.

No 2. *Blistering Plaister with Cantharides:*

R.—White wax	5 parts,
Olive oil	3 parts,
Butter of cocoa	4 parts,
Spermaceti	3 parts,
Turpentine	1 part.
	—
	16
Cantharides	1 part,
Common water	8 parts.

Mix all these substances in a silver vessel, and boil them moderately for two hours, carefully stirring the mixture during the whole process. Then withdraw it from the fire and suffer it to stand for twenty-five minutes, immediately afterward strain through linen.

This plaister is to be spread as the preceding, on sized paper. If it is desired to have the paper covered on both sides, take that which is *unsized*, cover one side and hold it over a chafing dish of coals, when the plaister will melt and penetrate the whole tissue on both sides.

(It appears to us that the length of time (two hours) that these materials are directed to be kept *boiling*, is not only unnecessary, but must prove injurious to the compounds. Cantharides will not endure much or long continued heat, without having their vesicating powers impaired.)

A stronger preparation is directed to be made by taking

Of the above recipient	12 parts,
Cantharides in powder	1 part,
Water	8 parts.

Melting and treating them in the mode prescribed.

These plaisters may also be spread on linen or silk, by immersing these fabrics in them while liquid, and passing them through rulers with sharp edges.

Blistering Plaister without Cantharides.

R.—White wax	18 parts,
Olive oil	9 parts,
Burgundy pitch	21 parts.
	48

Extract of the bark of mezereon prepared with

Alcohol	1 part,
Rectified Alcohol	6 parts.

Dissolve the wax in the oil, then add the extract, previously dissolved in the alcohol. Apply a moderate heat, long enough to evaporate the alcohol, constantly stirring the mixture. Afterwards add the Burgundy pitch, and when it is liquefied pass the whole through flannel. Emplastic tissues of paper, linen or silk may be prepared with this compound in the mode before described, covered either on one or both sides.

A stronger epispastic plaster may be made, viz:

R.—The above recipient	8 parts,
Alcohol containing 12 scruples of extract	1 part.

Plaister for Excoriations.

R.—White wax	6 parts,
Olive oil	4 parts,
Spermaceti	3 parts,
Butter of cocoa	3 parts.

Melt these substances in a proper vessel and dip into the mixture paper, linen, or silk, and pass the impregnated tissue through wooden rulers.

Formula for a Syrup of Gum Tragacanth.—M. Emile Mouchon, fils, Pharmacien at Lyons, has offered a recipe for the preparation of a syrup of gum tragacanth in the Journal de Pharmacie for September 1829.

He directs—Gum tragacanth, pure, 3 oz. 5 gros. 24 grains.
Pure river water, 9 lbs.

The gum is to be deprived of all impurities, reduced to powder, and subjected to the action of cold water for forty-eight hours, at a temperature of 20 or 25 degrees of Centrigade thermometer: the solution to be facilitated by frequently agitating the mixture with a large wooden spatula.

He then adds simple syrup at 30°, discoloured by animal charcoal and strained, 24 lbs.

The solution being perfectly homogeneous in all its parts, the half of the syrup, nearly cold, is to be incorporated in small portions, and with the greatest care; the mixture to be passed through linen with slight expression, and the remainder of the syrup then added, constantly stirring it. The syrup loses five degrees of density by the addition of the gum, although the consistence of the mixture is greater than the syrup. These proportions give four grains of gum tragacanth for one ounce of syrup, and which, according to Bucholz, represents, if not in quantity, at least in consistence, one hundred grains of gum arabic.

At a meeting of the Society of Pharmacy on the 13th January 1830,

M. Robiquet, in his name and in that of M. Bouton, presented to the society a crystalline matter extracted from bitter almonds. This matter has a saccharine and bitter taste, and appears to be of a particular nature. M. Pelletier found analogy between this substance and olivile. This analogy is disputed by the authors.

M. Faure, Jun. of Bordeaux, addressed to the society some observations upon the solidification of turpentine by magnesia. From these observations he has drawn the following conclusions: 1. That turpentine, even with the volatile oil, may be, or can be, solidified by magnesia. 2. That it may augment the medical energy of turpentine by adding to it the essence, and afterwards solidifying the mixture. 3. That these substances are not altered by this mixture. M. Faure has given the two following formulas:

Turpentine	14 grains,
Calcined magnesia	36 grains.

Mix in a marble mortar: at the end of five or six days they form a mass which may be rolled into pills, and which do not deform.

If the mass becomes very hard, it may be softened by aid of warm water.

Vol. ol. turpentine	2 gross,
Turpentine	6 gross,
Magnesia calcinat.	36 grains.

Mix in a mortar: the mass is solidified at the end of seven or eight days; it should be preserved in a close vessel.

No. iij. vi. annee.

Journal de Chemie Medicale de Pharmacie, &c.

Feb. 1, 1830.

JOURNAL

OF

The Philadelphia College of Pharmacy.

NEW SERIES.

VOL. II.—OCTOBER 1830.—NO. III.

Original Communications.

Das Brom und seine Chemishe Verhältnisse. Von Carl Löwig.

Bromine and its Chemical Combinations. By Charles Löwig. Heidelberg, 1829. *Translated and abridged by Elias Durand.*

[Continued from p. 105.]

Bromine and Cyanogen.

These two substances combine together in two different ways: 1. By uniting bromine with cyanuret of mercury; 2. By the action of bromine upon the solution of prussic acid. In the first instance, bromides of cyanogen and mercury are produced; in the second, hydrobromic acid and bromide of cyanogen are the result. The action is very prompt, and the temperature considerably increased.

Bromide of cyanogen forms, at a low temperature, in white and spungious acicular crystals, resembling so much those of the iodide of cyanogen, that they may easily be mistaken for them. It becomes fluid at 39°, and gaseous at 59°, and crystallizes again when submitted to the freezing point. Its smell is similar to that of the iodide of cyanogen, and, like it, irritates the eyes powerfully. Its taste is pungent; it bleaches litmus and turmeric paper, but does not redden the former, even when dissolved in water; it is a powerful poison. Its composition is as follows:

Cyanogen	26	or	1 atom,
Bromine	75.76	or	1 atom.

Bromine and Metals.

The combination of bromine with metals, as metallic bromides, may be performed in four different ways: 1. By a direct combination, which is frequently attended with a considerable disengagement of caloric and light, as it happens with arsenic, tin, potassium, &c. especially when these metals are pulverised. The action of bromine upon potassium is attended with such an intensity of heat and light that it produces a powerful detonation, capable of bursting the glass vessels in which the experiment is made, and scattering the products of the combustion. With other metals, such as iron, bismuth, mercury, &c. the temperature must be increased, in order to produce their combustion; but platinum, silver, gold, &c. do not combine with bromine at any temperature whatever. 2. By transmitting a current of vapour of bromine over such of the metallic oxides as are possessed of a greater affinity for bromine than for oxygen, and emit as much again oxygen as the metal can absorb of gaseous bromine. Such is the case with the oxide of silver at the ordinary temperature, and with alkalies at the red heat. Vapour of bromine transmitted over the red hot oxides of potassium, sodium, barium and calcium, produce a white heat; but those of magnesium and aluminum do not; bromine circulates round the latter without evolving the smallest trace of oxygen; the same happens with the oxide of zinc. Oxides which are decomposed by bromine seem to undergo no alteration when they are in combination with the strong acids. Balard tried in vain to separate oxygen from red hot sulphate of potassa by directing over it a current of gaseous bromine; but this does not occur when the acid has but a small affinity for the oxide. The alkaline carbonates may be decomposed by bromine, with evolution of a gas consisting of two volumes of carbonic acid and one volume of oxygen. 3. By uniting several metals with hydrobromic acid gas, some at the common temperature, others at a higher one. 4. By putting metallic oxides in contact with hydrobromic acid, some at a common temperature, others at a higher one, they are transformed into liquid metallic bromides.

These combinations are all solid at the ordinary temperature; many are fusible at a small degree of heat; such are the bromides of antimomy, arsenic, zinc, bismuth, &c.; and several of these are volatile. They are all decomposed by chlorine, with which they form a metallic chloride or a chloro-bromide, if bromine is in sufficient quantity. Hydrochloric acid decomposes them at a red heat, and evolves a corresponding volume of hydrobromic acid gas. Concentrated sulphuric and nitric acids separate the bromine from the metallic bromides, sometimes mixed with hydrobromic and sulphurous gases; this happens especially with the bromides of potassium and sodium.

Metallic bromides, with a few exceptions, are soluble in water and converted into hydrobromates. Several of them combine together to form salts, which, according to Bonsdorff and Boulay, &c. are simple salts, similar to those of the oxides and to the sulphates; and according to others, form binary salts. It belongs to Berzelius to resolve this question, which he first brought up in his important treatise upon the sulphates. Without ranging himself decidedly with those of the latter opinion, Mr Löwig, in the sequel of his work, considers the combinations as binary ones.

Bromine, under certain circumstances, combines with several metallic oxides, and forms compounds perfectly similar, as far as regards their physical properties, to the chlorides of metallic oxides. They are decomposed at a high temperature, and give up their oxygen. Sulphuric, nitric, hydrochloric, acetic, and even carbonic acids, liberate bromine from them. They oxidate many metals to the highest degree, destroy all organic colours, &c. The greatest part of the metallic bromides have a very great analogy with the corresponding metallic chlorides. One atom of hydrochloric acid gas evolves from the bromides one atom of hydrobromic acid gas.

Bromine and Potassium.

A. *Bromide of potassium.*—These two bodies combine together at a common temperature, with a considerable emission of light and caloric, and form a bromide of potassium. Vapour of bromine transmitted over red hot potassa evolves the oxygen of the alkali, and forms a bromide of potassium. Hydrobromic acid and potassium, at a high temperature, generate a bromide of potassium by separating hydrogen. Of the six different processes indicated by Mr Löwig for the preparation of the bromide of potassium, the most easy and economical is the following: saturate pure potassa or carbonate of potassa with hydrobromic acid, and evaporate the liquor; you obtain crystals, usually of a cubic form, possessing a strong sharp taste. The bromide of potassium decrepitates in the fire, and melts without undergoing decomposition. It is composed of 39.20 or one atom of potassium, and 75.76 or one atom of bromine.

It is decomposed at a high temperature by chlorine, which evolves bromine and forms a chloride of potassium. Iodine has no action upon it at a high temperature; but bromine, transmitted through melted iodide of potassium, liberates an abundance of violet vapours. Bromic acid does not decompose it at a red heat, at least when no vapour of water comes in contact with the heated mixture; in this latter case, hydrobromic acid is formed. The crystals dissolve in water, with production of a remarkable degree of cold; they are more soluble in warm than in cold water; the warm solution affords on cooling the recrystallization of part of the bromide. It dissolves but sparingly in alcohol.

B. *Hydrobromate of potassa* is obtained by dissolving the bromide of potassium in water, or by adding liquid hydrobromic acid to a saturated solution of potassa. It is composed of 47.20 or one atom of potassa, and 76.76 or one atom of hydrobromic acid.

C. *Bromide of potassa.*—Bromine united with carbonate of potassa produces a combination similar to that which the latter forms with chlorine. It has a yellowish colour, and bleaches and corrodes paper. Its smell is similar to that of the alkaline chlorides.

D. *Bromate of potassa.*—Mr Löwig gives four different methods for obtaining this salt; we shall only mention the two that are most easy and economical. 1. Add liquid bromine to a concentrated solution of potassa until the liquid becomes red, bromate of potassa is instantly precipitated. 2. Transmit bromine gas through a solution of carbonate of potassa until it ceases to be absorbed; introduce the vessel containing the mixture into another vessel filled with hot water; on cooling, the greatest part of the bromate of potassa crystallizes and is separated. The immersion in hot water of the vessel containing the mixture is renewed when the latter begins to cool, until it furnishes no more crystals. These crystals, as well as those of number one, are purified by solution in warm water and recrystallization.

This salt crystallizes in acicular masses, or in scales of a dull lustre. It melts as nitre at a moderate heat, without decomposing; is unalterable in the air, and of a cool taste, similar to that of nitre. It is sparingly soluble in cold water and alcohol, but very soluble in warm water. Thrown upon lighted coal, it melts and is converted into bromide of potassium, with emission of oxygen; rubbed with sulphur or other combustible bodies, it detonates powerfully by the electric spark, or by percussion; it is decomposed by the hydracids, and by the sulphurous and hydrosulphuric acids. Its composition is 47.2 or one atom of potassa, and 115.76 or one atom of bromic acid.

Bromine and Sodium.

Bromide of sodium.—The action of bromine on sodium has not yet been examined; but it probably resembles much that of bromine on potassium. It may be obtained by heating the hydrobromate of soda to perfect dryness. It is very soluble in water, and cannot be obtained in the state of crystallization.

Hydrobromate of soda is obtained in the same way as that of potassa; it crystallizes, melts with evaporation of its water of crystallization, and is converted into a bromide of sodium.

Bromate of soda is prepared as that of potassa. It crystallizes in small and brilliant cubes containing no water of crystallization. It melts at a high temperature with emission of oxygen and generation of bromide of sodium. Thrown upon red hot coals it detonates, and explodes by percussion when mixed with combustible bodies. It is sparingly soluble in water.

Bromine and Barium.

Bromide of barium.—When bromine gas is conducted upon red hot baryta, oxygen is liberated, and a bromide of barium formed. Hydrobromate of baryta is also converted by calcination into the same compound.

Hydrobromate of baryta is obtained by saturating pure baryta or its carbonate with hydrobromic acid; the liquor is then evaporated and crystallized. It forms prismatic acicular crystals, which melted on red hot coals are converted into bromide of barium. Its taste resembles that of the hydrochlorate of baryta. It is composed of

Baryta	76.60	or	1 atom,
Hydrobromic acid	76.76	or	1 atom,
Water	9.00	or	1 atom.

It dissolves easily in water and alcohol. When a current of carbonic acid is transmitted through its solution, a carbonate of baryta is produced, and the liquid, which then becomes yellowish, may be considered as an *hydrobromous acid.*

Bromate of baryta.—When bromine is introduced into a solution of caustic baryta, an hydrobromate and a bromate of baryta are produced. The greatest part of the latter crystallizes. It is also afforded by decomposing the hydrochlorate of baryta by the bromate of potassa; if the solution be not too much diluted, the bromate will instantly precipitate. It crystallizes in small needles of a pungent taste. It is soluble in warm, but sparingly so in cold water. It melts on red hot coals, and acquires a green colour.

Bromine and Calcium.

Bromide of calcium is obtained by conducting a current of bromine gas over red hot lime; oxygen is developed, and a bromide of calcium produced; it may also be prepared by calcining the hydrobromate of lime. It forms a white deliquescent mass of a sharp and bitter taste, similar to that of the chloride of calcium, and is composed of 20.50 or one atom of lime, and 75.76 or one atom of bromine. It is converted by water into an hydrobromate.

Hydrobromate of lime exists in spunges and other zoophytes; it is prepared by dissolving the bromide of calcium in water. It crystallizes with difficulty, takes up a good deal of water of crystallization, is very soluble in water, and is converted by calcination into a bromide.

Subhydrobromate of lime is produced by boiling the simple hydrobromate with caustic lime. It forms small acicular crystals, resembling the subhydrochlorate of lime. Water converts it into simple hydrobromate by precipitating the excess of lime.

Bromide of lime.—Like the chloride of lime, this compound is obtained only with the assistance of water. It is prepared by adding bromine to the milk of lime, and separating the excess of lime by means of the filter; a yellow fluid is formed which yields its bromine when slightly heated, and its oxygen at a higher temperature; an hydrobromate of lime remains in the liquor. Weak acids, even the carbonic acid of the atmosphere, disengage its bromine, and it acts otherwise exactly as the chloride of lime.

Bromate of lime is prepared by saturating bromic acid with lime. It crystallizes in parallelopiped crystals, containing water of crystallization, and detonates on red hot coals. Taste bitter and sharp.

Magnesium and Bromine.

Bromide of magnesium.—A current of bromine gas, conducted over red hot magnesia, circulates round that earth without evolving a trace of oxygen, or combining with it. This combination is obtained by directing a current of bromine gas over a mixture of pure magnesia and charcoal, heated to redness in a porcelain tube; carbonic acid gas is evolved, but no bromine. The residue, which is a bromide of magnesium, dissolves easily in water, with a hissing noise and a considerable disengagement of caloric. The solution may be considered as a hydrobromate of magnesia.

Hydrobromate of magnesia exists in sea water and in the bittern of many salt works. It is uncrystallizable and deliquescent.

Bromide of magnesia.—Bromine, introduced into a mixture of water and magnesia, affords, by agitating and filtering, a yellow fluid, possessed at first of the alkaline properties, but soon acquiring the power of bleaching.

Bromate of magnesia.—By mixing bromic acid with magnesia, a soluble salt is obtained, similar to the bromate of lime.

Hydrobromate of magnesia and potassa.—The very diluted solution of a mixture of the hydrobromates of magnesia and potassa, affords by spontaneous evaporation large and transparent crystals of rhomboidal columns, which are unalterable in the air, and melt at a high temperature in their water of crystallization. Taste similar to that of borax. Their composition is as follows:

Potassa	47.20	or	1 atom,
Magnesia	20.00	or	1 atom,
Hydrobromic acid	159.76	or	2 atoms,
Water	36.60	or	4 atoms.

or

Hydrobromate of potassa	126.59	or	1 atom,
Hydrobromate of magnesia	99.39	or	1 atom,
Water	56.00	or	4 atoms.

Aluminum and Bromine.

Bromide of aluminum.—Same preparation as the bromide of magnesium, but requiring a higher degree of heat.

Hydrobromate of alumina is obtained by dissolving the hydrate of alumina in hydrobromic acid, and evaporating the solution in a water bath. Taste extremely harsh and astringent, like alum; reddening litmus very feebly. It is soluble both in water and alcohol.

Bromide of alumina.—Bromine and hydrate of alumina mixed and agitated for a length of time in water, form no combination that may be considered as a bromide of hydrated alumina, inasmuch as the filtered fluid contains no alumina.

Chrome and Bromine.

Sesquibromide of chrome.—By evaporating to dryness, and calcining the subhydrobromate of chrome, a yellowish red powder is obtained, the composition of which is as follows:

Chrome	28.00	or	1 atom,
Bromine	117.58	or	1½ atom.

Hydrobromate of suboxide of chrome is obtained, 1, By dissolving in water the sesquibromide of chrome; 2, By pouring hydrobromic acid over chromate of lead, agitating the liquor, and separating by filtration the bromide of lead. After boiling the liquid for some time, it acquires a dark green colour. It is uncrystallizable.

Tritobromide of chrome is produced, according to Liebig, by distilling a mixture of bromide of potassium, chromate of lead, and sulphuric acid. Löwig could not succeed in obtaining this compound, which he considers only as a mixture of bromine and of sesquibromide of chrome. It is composed of one atom of chrome, and three atoms of bromine.

Perhydrobromate of chrome is a transparent fluid, which is converted by ebullition into a subhydrobromate. It is obtained by dissolving in water the tritobromide of chrome, or by dissolving, at a low temperature, the chromate of lead in hydrobromic acid.

Manganese and Bromine.

Bromide of manganese is formed by evaporating to dryness the hydrobromate of suboxide of manganese, and calcining it in a glass tube furnished with a small hole. It is a rose-coloured mass, melting at a red heat.

Hydrobromate of suboxide of manganese is obtained by dissolving in water the bromide of manganese, or the carbonate of suboxide of manganese in hydrobromic acid. On evaporating gently, the liquid affords a light red powder.

The *hydrobromate of oxide of manganese* is prepared by dissolving in concentrated hydrobromic acid the sesquioxide of manganese. The solution, decomposed by heat, is converted into hydrobromate and into bromine.

Arsenic and Bromine.

Bromide of arsenic.—When bromine comes in contact with arsenic, they burn with a brilliant flame, with a considerable evolution of caloric, and emit a very thick vapour. This compound is obtained in an insulated state by introducing in a tubulated retort a small quantity of bromine, and throwing on it, in small portions, some pulverized arsenic until it ceases to burn. A receiver is then fixed to the retort, and the bromide of arsenic distilled over. This substance remains solid in a temperature not above 60°; it melts a little above that point, and boils at 428°. It is perfectly transparent, of a light lemon colour, attracts the moisture of the air, smokes, and slightly volatilizes; on cooling, it crystallizes in long prisms. Its composition is, arsenic 37.60 or one atom, bromine 117.58 or one atom and a half. It is decomposed by water into hydrobromic acid and oxide of arsenic.

These two bodies form two other combinations, the ***subhydrobromate of oxide of arsenic,*** and ***superhydrobromate of oxide of arsenic.***

Antimony and Bromine.

Sesquibromide of antimony.—Antimony, in contact with bromine, produces the same phenomenon, and is prepared in the same way, as that of arsenic; it remains solid at 201°, melts above that point, and boils at 518°. It is colourless, and crystallizes in needles. It is composed of one atom, or 64.50 of antimony, and one atom and a half of bromine.

Antimony and bromine form two other combinations similar in every respect to those of arsenic as above mentioned; and besides two binary salts, the bromide of sulphuret of antimony, and the hydrobromate and hydrosulphate of antimony.

Bismuth and Bromine.

Simple bromide of bismuth is obtained by heating in a long tube pulverized bismuth with an excess of bromine; yellowish vapours are perceived on the sides of the tube, which seem to be a bromide of bismuth with an excess of bromine, and there remains in the bottom another metallic bromide of the colour of steel, resembling a mass of melted iodine. It melts at about 392°, and acquires a hyacinth red colour; boils at the beginning of red heat, deliquesces in the air, and acquires a beautiful yellow colour. Its composition is 71 or one atom of bismuth, and one atom of bromine.

The other combinations of bromine and bismuth mentioned by Löwig, are the *hydrated bromide*, the *subhydrobromate*, and *perhydrobromate of bismuth*.

Zinc and Bromine.

Bromide of zinc is obtained by heating in a glass tube the hydrobromate of zinc. It solidifies in lanciform crystals in the remotest part of the tube, and is perfectly similar to the bromide of antimony. It is composed of one atom of zinc and another of bromine.

Bromide of oxide of zinc is obtained by shaking together for a long time a mixture of bromine and of oxide of zinc. The colour and smell of bromine disappear. It destroys vegetable colours.

Hydrobromate of oxide of zinc is produced by dissolving the metal in an aqueous solution of hydrobromic acid; hydrogen gas is evolved. It is crystallizable, is decomposed by water, and melts at a higher degree of temperature than the bromide of zinc.

Tin and Bromine.

Simple bromide of tin is produced by heating tin in hydrobromic acid gas, or by heating tin with the simple bromide of mercury; an alloy of tin and a simple bromide of tin are formed; the latter is a brilliant whitish gray mass, melting at a high temperature into a yellow oily fluid.

Deutobromide of tin.—Tin burns in contact with bromine, and forms a solid compound of a white crystalline appearance, melting easily and subliming. It is composed of one atom of zinc, and two atoms of bromine. It may also be prepared by adding bromine to the simple bromide.

There are besides two other combinations of bromine and tin, the ***hydrobromate of suboxide***, and the ***hydrobromate of oxide of tin.***

Lead and Bromine.

Bromide of lead.—One of the processes for obtaining this compound, is by digesting the oxide of lead with hydrobromic acid. It forms brilliant prismatic needles, sparingly soluble in cold water, but becoming more so by the addition of a few drops of nitric, muriatic or acetic acids.

The other combinations of bromine with lead, mentioned by Mr Löwig, are the ***simple hydrobromate of lead***, which is prepared by dissolving the bromide of lead in water; the ***bromate of oxide of lead***, obtained from the decomposition of the bromate of potassa by the nitrate of lead, and several binary combinations, such as those of the ***bromide of lead with the oxide of lead***; the ***carbonate of lead with the bromide of lead***; the ***phosphite of the oxide of lead with the bromide of lead***; the ***phosphate of the oxide of lead with the bromide of lead***; the ***bromide of lead and potassium***; the ***hydrobromate of lead and potassa***; the ***bromide of lead and sodium***; and the ***hydrobromate of lead and soda.***

Iron and Bromine.

Simple bromide of iron is obtained by pouring bromine upon iron filings, or by heating together a mixture of hydrobromate of ammonia and iron filings. Its colour is yellow and its fracture crystalline. It melts with difficulty, and is composed of one atom of iron and one of bromine.

Sesquibromide of iron is afforded, 1, By heating the simple bromide of iron with bromine; 2, By evaporating slowly the hydrobromate of oxide of iron; the latter is converted into a sesquibromide, with evolution of hydrobromic acid, and into a subhydrobromate of iron. It forms a brownish red mass, melting easily, and subliming at a low temperature into a mass which, in external appearance, resembles perfectly the mussive gold.

Hydrobromate of suboxide of iron is prepared by dissolving the simple bromide of iron in water. This compound is converted by exposure to a damp air into a *hydrobromate of sesquioxide of iron,* which, being itself dissolved in water, abandons part of its oxide and becomes a *hydrobromate of suboxide of iron.*

Sesquihydrobromate of oxide of iron is obtained by dissolving in water the sesquibromide of iron, or by adding a sufficient quantity of bromine to a perfectly saturated solution of the hydrobromate of suboxide of iron. Gently evaporated to the consistence of a syrup, it affords crystals after a few days rest; evaporated to dryness, it forms a mass not distinguishable from the oxide of iron. It attracts powerfully the moisture of the air, tastes very strong, and stains the skin of a red brown colour.

Subhydrobromate of oxide of iron is obtained by the evaporation of the hydrobromate of oxide of iron, or by the decomposition of the hydrobromate of suboxide by a small quantity of potassa.

Bromate of suboxide of iron.—By mixing the solutions of sulphate of iron and of bromate of potassa, a brown red precipitate is afforded, which dissolves in a greater proportion of water, and forms a reddish brown liquid.

Bromate of oxide of iron has not been produced by a mixture of the solutions of hydrochlorate of iron and of bromate of potassa.

The binary compounds are the following: *sesquibromide of iron, and bromide of ammonium; sesquibromide of iron and chloride of ammonium; sesquibromide of iron and bromide of potassium; sesquibromide of iron and bromide of sodium; bromide of cyanuret of iron.*

Copper and Bromine.

Subbromide of copper.—To obtain this combination, it is necessary to fill up a long tube with pieces of pure wire or sheet copper, and with bromine in such manner as the vapour of bromine may come at once in contact with all the copper. The tube should be equally heated.

Perhydrobromate of suboxide of copper is obtained by dissolving the subbromide in hydrobromic acid; it is a colourless fluid, losing by evaporation its hydrobromic acid. It precipitates metallic gold from its combinations with hydrochloric and hydrobromic acids.

Hydrobromate of sesquioxide of copper.—By evaporating slowly the simple hydrobromate of copper, a portion of its bromine escapes when arrived at a certain degree of concentration, and the liquid is converted from a green into a dark brown colour. By the addition of water, it acquires again a green colour, and a subbromide of copper is precipitated.

Simple bromide of copper is afforded by slowly melting the crystals of the simple hydrobromate of copper; or by burning copper in gaseous bromine, by which a subbromide and a small quantity of simple bromide of copper are obtained.

Simple hydrobromate of oxide of copper is obtained by dissolving in water the simple bromide of copper; it crystallizes in regular rectangular columns of a green colour.

Subhydrobromate of oxide of copper is prepared by precipitating the simple hydrobromate of copper by a small quantity of ammonia. It is a green powder which is converted by heat into oxide of copper and subbromide of copper, or into oxide of copper and simple bromide of copper.

Bromate of oxide of copper is not precipitated by mixing the solutions of hydrobromate of oxide of copper with the bromate of potassa.

The other compounds described in the work under consideration, are the *hydrochlorate of subbromide of copper*, the *oxide of copper and subbromide of copper*, and the *oxide of copper and simple bromide of copper.*

Mercury and Bromine.

Subbromide of mercury is obtained by precipitating the hydrobromate of potassa by the nitrate of mercury, or by the action of hydrobromic acid on the suboxide of mercury. It forms a white powder perfectly similar to calomel, subliming at a moderate heat without alteration. It has no taste nor smell. It is composed of two atoms of mercury, and one atom of bromine. Mixed with an alkaline solution, a hydrobromate is formed, and the oxide of mercury is thrown down.

Simple bromide of mercury is prepared by combining directly bromine and mercury, or by subliming a mixture of sulphate of mercury and bromide of potassium; it is composed of equal atoms, and is much less soluble than corrosive sublimate.

Simple hydrobromate of mercury is produced by dissolving the simple bromide in water, or the oxide of mercury in hydrobromic acid. The alkaline solutions precipitate from its solution the red oxide of mercury, and liquid ammonia, a white powder. Besides this salt of the hydracid, two others are mentioned in the work, viz. the *sesqui and deutohydrobromate of mercury.*

Bromate of oxide of mercury is obtained by decomposing the nitrate of mercury by the bromate of potassa, or by digesting some oxide of mercury in a solution of bromine, and separating the bromide of mercury by alcohol. It is a grayish powder, soluble in nitric acid.

Under the head of bromine and mercury, Löwig mentions forty-five binary combinations of their compounds with other substances, which it would be too long even to enumerate.

Silver and Bromine.

Bromide of silver is prepared by adding to a solution of nitrate of silver an alkaline hydrobromate; a caseous precipitate is produced, which, dried in the shade, acquires a light yellow colour; when heated, it melts into a red fluid, which, on cooling, affords a yellow mass similar to horn. Its composition is 108 parts, or one atom of silver, and one atom of bromine. On exposure to the solar rays, it becomes black, if not perfectly dry. It is insoluble in water, nitric acid, and in cold sulphuric acid; and dissolves in hydrobromic and hydrochloric acids, and in concentrated aqua ammoniæ; but diluted aqua ammoniæ has no action upon the bromide of silver, whilst it dissolves the chloride of silver. The latter is, therefore, the means of separating the bromide from the chloride of silver.

Perhydrobromate of oxide of silver.—Concentrated liquid hydrobromic acid dissolves nearly its weight of bromide of silver; on evaporating the solutions, the latter crystallizes in octahedrons.

Bromate of oxide of silver is obtained by precipitating the nitrate of silver by the bromate of potassa. It is a white powder, which is scarcely altered by light. It is insoluble in water and nitric acid, but it dissolves in liquid ammonia. Thrown upon live coals, it detonates like nitre.

The binary combinations of bromine and silver are as follows: the *hydrobromate and hydrochlorate of silver;* the *bromide of silver and ammonia;* the *hydrobromate and ammoniuret of oxide of silver;* the *hydrobromate of silver and potassa,* and the *hydrobromate of silver and soda.*

Gold and Bromine.

Bromide of gold.—According to Balard, bromine and its watery solution dissolve a small quantity of gold. A brownish yellow metallic mass, colouring animal substances of a violet colour, is thus obtained, which is converted by heat into bromine and metallic gold. According to Lampadius, gold dissolves easily in bromine, and the dry bromide of gold is of a dark gray colour, without any metallic lustre, very soluble in water, and affording a dark red solution, from which he obtained crystals of hydrobromate of gold of the the same colour. One grain of these crystals will colour, in a perceptible manner, 5000 grains of water. The solution reacts nearly in the same way as the chloride of gold. According to the latter chemist, 100 parts of dry bromide contain 50 of metallic gold.

Platinum and Bromine.

Bromide of platinum.—Bromine has no action on platinum at the common temperature: but this metal dissolves in nitro-hydrobromic acid, affording a solution of a yellow colour, which is decomposed by caloric, and produces, in the same manner as the chloride of platinum, in the solutions of potassa and ammoniacal salts, a yellowish precipitate, scarcely soluble.

Bromine and Organic Bodies.

Bromine, from its great affinity for hydrogen, deprives of that principle almost all the organic substances, and forms with it hydrobromic acid. The latter partially combines with the decomposed organic matter, after having separated from it, by its great affinity for water, two equal volumes of oxygen and hydrogen, to form liquid hydrobromic acid. The carbon liberated from the organic matter combines also in *status nascens* with another portion of bromine, and forms a bromide of carbon, and frequently an hydrobromide of carbon by the union of bromine with both carbon and hydrogen.

By this property of altering the combination of the elementary principles of organic matter, it must, of course, destroy all contagious miasmata, putrid smells, and colours.

Bromine combines with a small number of organic substances; the only combination of this kind as yet known is that of bromine and starch, which is obtained by adding a few drops of bromine to a solution of starch. In the same way as iodine produces with the starch a fine blue colour, so its mixture with bromine is coloured of an orange yellow. It dissolves in acetic acid, which it decomposes only after some time. Alcohol takes up a large quantity, with a considerable evolution of caloric and hydrobromic acid; bromide of carbon and hydrobromide of carbon are formed. By treating alcohol with the hydrobromic acid, an ***hydrobromic ether*** is produced. Serullas gives the following method for preparing it: 40 parts of alcohol of 38° of Baume's areometer are introduced into a tubulated retort with a certain quantity of phosphorus, and from 7 to 8 parts of bromine are added in small portions. As soon as the latter comes in contact with phosphorus, a combination takes place with a great evolution of caloric, and hydrobromic and phosphorous acids are produced. It is then distilled at a gentle heat, and the product collected in a receiver surrounded with ice. By mixing this product with water, the hydrobromic ether separates immediately and sinks to the bottom. It is purified from the acid which might have passed over, by washing it with a weak solution of potassa.

Hydrobromic ether is heavier than water, colourless, and becomes perfectly clear by long standing. Its taste is sharp, and its smell very ethereal. It is very volatile and soluble in alcohol, from which it is precipitated by water.

Bromine dissolves in ether with generation of caloric, and sometimes with combustion. It is decomposed in the same way as the alcoholic solution. The mixture of the ethereal solution of bromine and water, exposed to the solar rays, passes from the red colour to a brownish one; if, then, the fluid is agitated with a weak solution of potassa, in order to remove the liberated bromine and the hydrobromic acid, a smell of acetic ether is soon evolved. By distilling a large quantity of this fluid, thus treated, Löwig was enabled to obtain pure acetic ether.

Fatty oils act slowly on bromine, which by them is converted into hydrobromic acid; an instantaneous reaction takes place by mixing bromine with essential oils. Balard observed that by adding a few drops of bromine to the essential oils of turpentine and aniseed, a disengagement of caloric with evolution of hydrobromic acid gas took place, and the essential oil was converted into a resinous yellowish mass, resembling turpentine.

Camphor is very soluble in bromine, and loses, in a great measure, its smell and volatility. This combination, at a low temperature, becomes solid and crystalline.

On Weights and Measures. By Benjamin Ellis, M.D.

[Continued from page 185.]

In the last number of our Journal I gave a somewhat elaborate account of the origin and changes of the English system of metrology. The new French system of weights and measures, founded on the following principles, remains to be noticed.

"1. That all weights and measures should be reduced to one *uniform* standard of linear measure.

"2. That this standard should be an aliquot part of the circumference of the globe.

"3. That the unit of linear measure, applied to matter in its three modes of extension, length, breadth, and thickness, should be the standard of all measures of length, surface, and solidity.

"4. That the cubic contents of the linear measure in distilled water, at the temperature of its greatest contraction, should furnish at once the standard weight and measure of capacity.

"5. That for every thing susceptible of being measured or weighed, there should be only one measure of length, one weight, one measure of contents, with their multiples and subdivisions exclusively in decimal proportions.

"6. That the principle of decimal division, and a proportion to the linear standard, should be annexed to the coins of gold, silver, and copper, to the moneys of accounts, to the division of time, to the barometer and thermometer, to the plummet and log lines of the sea, to the geography of the earth, and the astronomy of the skies; and finally, to every thing in human existence susceptible of comparative estimation by weight or measure.

"7. That the whole system should be equally suitable to the use of all mankind.

"8. That every measure and every weight should be designated by an appropriate, significant, characteristic name, applied exclusively to itself."

This system originated in the stormy period of the French revolution. In a philosophical point of view it presents the beau-ideal of perfection. But when reduced to practice, it met with obstacles in the physical and moral world, in the constitution of things and the nature of man, absolutely insurmountable. Its destiny affords another striking proof that the conceptions of man are much more vast than his powers of execution. It was, however, a noble attempt to improve the condition of the human race. At the time it was undertaken there was no civilized country on the globe whose weights and measures demanded improvement more than those of France; and there was no country more abundant in the talent to conceive and the will to execute such an enterprise; none more awake to the benefit the human family would derive from its universal adoption, and none more avaricious of the glory which would redound to the nation of its birth. The excessive diversity and confusion of the weights and measures employed in France, induced the prince de Talleyrand, then bishop of Autun, in the year 1790, to suggest to the members of the constituent assembly the project of a new system of metrology, founded on a single and universal standard. For this purpose he preferred the pendulum beating seconds, and a decree modelled on his proposition was adopted by the assembly, requiring, 1. That exact copies of all the different weights and elementary measures *used* in every town in France should be obtained and sent to Paris. Louis the XVI. was requested by the assembly personally to address a letter to the king of England, inviting him to propose to the parliament the formation of a joint commission of members of the Royal Society, and the Academy of Sciences. It was designed that this commission should meet at the most suitable place, and proceed immediately to ascertain the length of the pendulum at the 45th degree of latitude, and from it form an invariable standard for all weights and measures. Finally, the French academy were to fix with precision the tables of proportion between the new standards and the weights and measures heretofore used throughout the kingdom, and to supply every town with copies of these tables. Either owing to national jealousy, or the peculiar temper of the times, the proposition was not seconded on the part of Great Britain; and the only opportunity ever yet presented for the formation of a common standard of weights and measures between these two great nations, was lost. Other nations, however, were invited to furnish their share of talent and learning, and to participate in the honours and the benefit that would arise from its completion. Spain, Italy, the Netherlands, Denmark, and Switzerland, were actually represented in the academy, and contributed to the accomplishment of the common object. The committee of the academy chosen under the decree of the assembly consisted of Borda, Lagrange, Laplace, Monge, and Condorcet, five of the most eminent mathematicians of Europe. On the 19th of March 1791, they reported to the academy, a copy of which was transmitted forthwith to the assembly, and there ordered to be printed. Three natural standards presented themselves to the committee, viz. the pendulum beating seconds, a quarter of the equator, and a quarter of the meridian. After full deliberation they gave the preference to the last, and proposed that its ten millionth part be taken as the standard unit of linear measure: that the pendulum beating seconds at the 45th degree of latitude be assumed as a standard of comparison with it; and that the weight of distilled water, at the point of freezing, measured in a cubical vessel in decimal proportion to the linear standard, should determine both the standard of weights and the vessels of capacity. For the execution of this plan they proposed six distinct scientific operations, to be performed by as many separate committees of the academy.

"1. To measure an arc of the meridian from Dunkirk to Barcelona, being between nine and ten degrees of latitude, including the 45th, with about six to the north and three to the south of it, and to make upon this line all suitable astronomical calculations.

"2. To measure anew the bases which had served before for the admeasurement of a degree in the construction of the map of France.

"3. To verify, by new observations, the series of triangles which had been used on the former occasion, and to continue them to Barcelona.

"4. To make, at the 45th degree of latitude, at the level of the sea, in vacuo, at the temperature of melting ice, observations to ascertain the number of vibrations in a day of a pendulum, equal to the ten millionth part of the arc of the meridian.

"5. To ascertain, by new experiments, carefully made, the weight, in vacuo, of a given mass of distilled water, at the freezing point.

"6. To form a scale and tables of equalization between the new measures and weights proposed, and those which had been in common use before."

The assembly having sanctioned this report, appointed four committees of the academy, and entrusted the execution of the three first named objects to one committee, consisting of Mechain and Delambre.

Borda, Mechain, and Cassini undertook the experiments on the pendulum; those on the weight of water were committed to Lefevre Ginæau, and Fabbroni; and the scale and tables to a large committee on weights and measures.

More than seven years were spent in the accomplishment of these different operations. In prosecuting those experiments instituted to ascertain the weight of distilled water at the freezing point in vacuo, and for the admeasurement of the arc of the meridian, two important and highly interesting discoveries were made. Newton long since ascertained that the earth was not a perfect sphere, but an oblate spheroid, flattened at the poles. But the proportions of this flattening, or the difference between the two diameters of the earth, had only been conjectured from a number of facts. As the arc now to be measured exceeded any former attempt in the distance, the committee who undertook it were instructed to ascertain with greater accuracy the difference between the circles of the meridian and the equator. The result of their researches was that the flattening was of $\frac{1}{334}$; or that the axis of the earth was to the diameter as 333 to 334. The other discovery was the important law of nature now known to every tyro in philosophy, that freezing water not only ceases to contract at 41° of Fahrenheit, but actually commences to expand until it is fixed in ice at 32°. Anterior to these experiments it was believed that the freezing and expansion were simultaneous.

The legal weights and measures of France were employed in the prosecution of these operations. The standard from which the measures were taken for ascertaining the arc of the meridian was the toise or fathom of Peru, so named from having been employed for the same purpose in that section of South America.

Delambre and Mechain used two platina rods in their mensurations, each double the length of this toise of Peru. A repeating circle, a levelling instrument, and a metallic thermometer with two blades, one of brass, the other of platina, designed to show the effect of the atmospheric changes on the two metals, were also employed by the committee. The weights used for comparison with the new standard were a pile of 25 Paris pounds, called the weights of Charlemagne, which, though not of the antiquity of that prince, had been in use for more than 500 years.

The toise of Peru measured six standard royal feet of

France, the foot twelve thumbs, and the thumb twelve lines, so that the toise was equal to seventy-two thumbs, or eight hundred and sixty-four lines. The standard metre of platina, the ten millionth part of the meridian measured on the brass fathom of Peru, 443 lines and 295.936 decimal parts of a line. The definitive length of the metre was, therefore, fixed at 443.296 lines, equivalent by subsequent experiments of the academy to 39.3827 English inches.

The Paris pound, pois de marc of the pile of Charlemagne, consisted of two marks, each mark of eight ounces, each ounce of eight gros or drachms, and each gros of three deniers or pennyweights, and each pennyweight of twenty-four grains.

The pound, therefore, contained 9216 grains, equal to fifteen ounces, fifteen pennyweights, or 7560 grains, troy weight. The cubic decimetre, or tenth part of the metre of distilled water, at the temperature of its greatest density, weighed in vacuo, was found equal with $18,827\frac{15}{100}$ grains, or 2 pounds 5 gros $35\frac{15}{100}$ grains of the mark weight. This was denominated the *kilogramme,* and was made the standard weight, its $\frac{1}{1000}$ part being the gramme or unit, equivalent to 15.44572 grains troy. The vessel that would hold this kilogramme of water at its greatest density was made the standard for all measures, liquid or dry, under the title of the *litre.* It contains 61.0271 cubic inches, about one-twentieth more than our wine quart. The metre was applied to superficial and solid measures, according to their proportions; the chain of ten metres being applied to land measure, and its square denominated an aré; the cubic metre was called a stere.

To complete the system, every weight and every measure had a new and specific denomination attached to it. To all of these weights and measures, the principle of decimal arithmetic was exclusively applied. The units were all multiplied and divided by the number 10.

This system encountered difficulties from its very birth.

The admeasurement of the meridian commenced when the whole nation was under the excitement of revolutionary movements. The suspicions of the people were alarmed at the appearance of the commissioners while prosecuting the survey, and took them for spies or engineers of the invading enemies of France. And before the original plan could be completed, the national assembly passed a law, on the first of August 1793, directing the system to go into immediate operation. The standard metre was to be taken from the old admeasurement of the meridian in 1740. New denominations, decimal divisions, and a complete system of weights and measures were to be based on this standard, all of which, however, were to be temporary, and to yield precedence to the other when the definitive length of the metre should be ascertained. This act suspended, as was probably intended, the further prosecution of the original plan. Nevertheless, in September 1793, a decree was passed authorising the temporary continuance of the committee on weights and measures; yet in December following, a decree of Robespierre's committee of public safety dismissed from the commission Borda, Lavoisier, Laplace, Coulomb, Brisson and Delambre, on the pretence that their republicanism was not sufficiently pure. Mechain was at this time a prisoner in Spain.

The commission of weights and measures was directed by a decree of Robespierre and his committee to forward to the United States of America a copper metre and weight, exact copies of the standards just then adopted. On the 2d of August 1794 the French minister, Fauchet, sent them to the secretary of state, with a letter earnestly recommending them to the adoption of the United States. The president communicated the subject to congress in 1795.

On the 7th of April 1795, the national convention passed a decree, authorising all the operations in the measurement of the meridian to be renewed, and at the same time abolishing the temporary nomenclature, and establishing a new one, which has remained permanently a part of the system. The units which have been already mentioned, viz. the grammé, metre, aré, litre and stere were not altered. To express the weights or measures growing out of these units by multiplication, the Greek words denominating 10, 100, 1000, 10,000, &c. were prefixed as additional syllables, while their division into 10, 100, 1000 parts, &c. was expressed by similar Latin syllables.

Thus,

Millimetre	0.001
Centimetre	0.01
Decimetre	0.1
Metre	1
Decametre	10
Hectometre	100
Kilometre	1000
Myriametre	10,000.

Nothing can be more simple and beautiful than this nomenclature in theory; but it was the most difficult of all the parts of the system to reduce to practice. It consists of twelve new words, five of which denote the things, and seven the numbers; and by their combination form significant and appropriate names for every weight and measure in the new scheme. Thus one of the greatest sources of error and confusion is avoided in weights and measures, viz. the application of the same name to different things, or of different names to the same thing; and as the whole turns on the pivot of decimal arithmetic, the mind appreciates the quantity of the weight or measure by the appropriate name. But habit exercises unbounded influence over our minds. The French people refused to adopt this nomenclature, and while they were obliged to part with the old system of weights and measures, and accept a new one founded on philosophical principles, standarded on the immutable circle of the globe, they insisted on employing the old names. Thus they call one-half of a kilogramme a pound, and one-third of the metre they denominate a foot. Now this weight is not a pound, nor this measure a foot, but they are very near them, and, therefore, they obtain a more correct idea of their respective values, by applying to them names with which they are familiar, than those which convey to them no idea at all, or a very indistinct one.

The same decree of 7th of April, which authorised the adoption of this nomenclature, directed that all the operations commenced under the direction of the academy of sciences should be renewed; and the persons employed in their execution were reinstated by the committee of public instruction of the national convention. The admeasurement of the arc of the meridian was at once resumed by Mechain and Delambre, and successfully executed.

The former conceived the idea of extending the survey to the Balearic isles, which would have made the portion of the arc south of the 45th degree equal to that northward of it. This supplementary task was nearly completed when he was arrested by death, in September 1805, in the Spanish province of Valencia.

His more fortunate associate, Delambre, published an account of this admirable undertaking in 4 vols, 8vo. Their whole proceedings in this admeasurement were submitted to a committee of the mathematical and physical class of the national institute, that phœnix of science, which had risen on the ashes of the academy of sciences. The experiments on the length of the pendulum, and for ascertaining the specific gravity of distilled water at its maximum of density, were submitted to the same committee. The whole was embraced in two reports made by Tralles of the Helvetic confederation, and Van Swinden of the Netherlands, two of the foreign associates who had been invited to co-operate in the labour, and participate in the honour of the undertaking. Van Swinden combined these two reports into one, for the general meeting of the institute; and that body transmitted it with all due solemnity to the two branches of the national assembly of France, on the 22d of June 1799, together with a definitive metre of platina made by Lenoir, and a kilogramme of the same metal made by Fortin. La Place, the presiding member of the institute, made an appropriate address, which was returned by the respective presidents of the two legislative chambers. The standard metre and kilogramme were deposited on the same day in the hands of the keeper of the public archives, who recorded the fact and signed it, together with all the members of the institute, foreign associates and artists, whose joint labours had contributed to the accomplishment of this great work.

The temporary metre and kilogramme made from the old admeasurement of the meridian, and adopted in 1793 and 1795, were abolished in December 1799.

That metre had been fixed at $443\frac{44}{100}$ lines, while the new and definitive metre was determined to be $443\frac{296}{1000}$ lines, a difference scarcely appreciable for ordinary uses, yet perceptible when multiplied to the cube for the measure of capacity and weight. Thus the temporary kilogramme had been of 18,841 grains mark weight, while the new and definitive one was reduced to $18{,}827\frac{15}{100}$ grains. But the thirst of novelty and change was only surpassed by the general infidelity of the French philosophers and rulers; and as a principle of uniformity, it was urged that in regulating weights and measures, the mensuration of time ought to be included.

It was therefore determined, as the origin of the French republic formed a new era in the world, to abolish the Gregorian calendar, and commence the new year with the day that the republic was established, viz. 22d of September 1792.

The division into twelve months was retained, but each month was divided into thirty days, or three times ten. The seventh day, as a day appropriated to piety and repose, was abolished, and every tenth day was dedicated to some moral abstraction, such as liberty, equality, fraternity, patriotism, &c. *and once a year to the* Supreme Creator, whose existence the national convention did him the honour, in the plenitude of their wisdom, to acknowledge by a formal declaration.

Five or six complementary days remained after the completion of the thirty-six decads, and these were holydays, in which were to be revived the Olympic games of ancient Greece.

The names of the months were to be significant, and this part of the system was as beautiful as the other was ridiculous. Each of the three succeeding months composing the four seasons of the year, were to have the same terminating syllable; thus, the word *aire*, expressive of the feelings accompanying autumn, was to be assigned to this season; the 2d, *ose*, was believed appropriate to winter; the 3d, *al*, expressive of the sprightliness of spring, and the 4th, *dor*, significant of the fervid temperature of summer.

Thus in autumn, Vendemi-aire was the month of vintage; Brum-aire the month of fogs; and Frim-aire the month of incipient cold. Winter comprised Niv-ose, the month of snow; Pluvi-ose, the month of rain; and Vent-ose, the month of wind. Then followed smiling and musical spring, Germin-al, the month of buds; Flore-al, the month of blossoms; and Prairi-al, the month of blooming meads. Finally, for summer, Messi-dor, the month of harvests; Thermi-dor, the month of heat; and Fructi-dor, the month of fruit.

The days of the decad were to be denominated according to their number; thus, primedi, the first day; duodi, the second; and so on to decadi; the tenth day, which was devoted to relaxation and the contemplation of virtue.

But the new calendar clashed with the new metrology in the article of the pendulum. The day was to be divided into 10 hours, each of 100 minutes, and each minute of 100 seconds: now the pendulum, in this case, would be required to vibrate 100,000 times in 10 hours, or one day, while the pendulum beating seconds of the old calendar, and designed as a test for the metre, would only oscillate 86,400 times in the solar day of 24 hours.

For the space of twelve years such was the calendar of the French nation: but the division of the day into 100,000 parts was first indefinitely suspended in April 1795. In April 1802, when Napoleon was first consul, a law was passed retaining the *equinoctial* calendar for all civil purposes, but, resuming the *solstitial* or Gregorian calendar, so as to restore the week of seven days with their names, and its sabbath as the first of them. But on the 9th of September 1805, in the month of fruits, when Napoleon had been crowned emperor, and France claimed the incongruous title of "*republican empire*," a senatus consultum ordained that on the 11th of the torpid month of snows, Nivose, 14th year of the republic, the 1st of January 1806 should reappear, and the Gregorian calendar be restored to use throughout the kingdom.

The application of the metrical system to geography and astronomy was a more rational and desirable part of the scheme: but it was found to be impracticable, as it would have rendered useless all the tables, maps, charts, and instruments indispensable to the geographer or navigator, as they are now, and have always been constructed. The quadrant would have been divided in 10 parts each of 10 degrees, and each degree therefore would have been equal to 100,000 metres, and the number of degrees to encircle the earth would have been 400. The facility of nautical calculations would have been increased; but the division of the sphere into 360 and quadrants of 90 degrees, originated in the coincidence of the daily rotations of the earth in its orbit round the sun, which, as near as numbers can bring it, is one degree every day. This, together with the division of the day into 24 hours, founded on a similar coincidence of time in the rotation of the earth round its axis, as well as all the details of this system, have been in use from immemorial time among all civilized nations, and to abolish it could not tend to uniformity, unless it were certain the other would be as universally adopted.

In the construction of the thermometer and barometer, the application of the decimetre to them increased their facilities for observation and calculation. The thermometer had always been graduated in an arbitrary manner, and was different in different countries. Reaumur's thermometer, used in France, put the freezing point at 0, and that of ebullition at 80. Fahrenheit's, commonly used in England and the United States, has the freezing point at 32°, and the boiling point at 212°.

The centigrade, whose graduation is on the principle of decimal arithmetic, has the point of congelation fixed at 0, and that of ebullition at 100. Its degrees are to those of Reaumur as 5 to 4, and to those of Fahrenheit as 5 to 9.

It was also attempted, and with some success, to regulate the coins and moneys of France by the new metrology; but, as this was pursued separately, and only made incidentally dependent on the other points of the scheme, it was consequently less perfect than it would have been, had it been made, as in the old system, an essential part of the structure. The application of the metrical system to the tonnage of ships and boats, and size and form of casks, was not among the least of its difficulties. The habits of a nation, confirmed by the usage of centuries, were not to be set aside in an hour by the decree of any government, however strong and despotic. The law with respect to the employment of the new system in ascertaining the tonnage of ships, was founded in error, and was probably never enforced. That regulating the size and form of casks was found to be impracticable, and was consequently revoked.

The new system was carried into every department of human pursuits. The mariner's compass, the log line, sounding line, and ships' cable, were all included in the scope of decimal metrology.

It was before observed that the adoption of the new nomenclatures was opposed by an unwillingness or obstinacy on the part of the French nation, that was completely insurmountable. The supreme law of the land was made to bend, therefore, before the will of the people, and after a vascillating legislation, an imperial decree was issued in 1812, which, while it retained the *units* of the new weights and measures, allowed them to be divided by other than decimal numbers. Thus gradually were the old names re-introduced and applied to measures and weights to which they never before belonged. For retail sales of all articles which are sold by weight, the shopmen were allowed to employ the following *usual weights.*

The pound (livre), equal to half a kilogramme, or 500 grammes, which shall be divided into sixteen ounces.

The ounce (once), or one-sixteenth part of the pound, which shall be divided into eight gros.

The gros, or one-eighth part of the ounce, shall be divided into halves, quarters and eighths.

They shall bear with their appropriate names the indication of their weight in grammes.

So far as I can learn, the present condition of the French metrology varies but little from the form it assumed under the imperial decree of 1812. That decree, while it allowed the people to use a system grafted on the new metrology, retained the latter for all commercial transactions on the large scale, required that it should be taught in all the schools, and be exclusively used in all the public offices, markets, &c.

Such is the aspect of this splendid monument of genius and learning. If the old system of France was confused and diversified—if scarcely two cities employed the same weights and measures, she has little to boast of on the score of improved uniformity; for we now find the remains of four systems, established at different times, and superseding each other.

1. That which existed before the revolution.

2. The temporary system established by the law of 1st August 1793.

3. The definitive system established by the law of 10th December 1799.

4. The *usual* system *permitted* by the decree of 12th February 1812.

The difficulties which this system has encountered, and the changes which have forced themselves upon it, in the attempt to reduce it to practice, sufficiently show the impracticability of breaking up by a coup de main the established usages of centuries.

It is evident that the authors of this system, in the ardour of their search after an universal standard for weights and measures, had more regard to the theories of philosophy than the moral nature of man. Laws and customs spring out of the constitution of man, modified always by the circumstances which surround him.

The foot, a measure which had been in use at least since the times of the ancient Greeks, possessed several superiorities over the metre. It was derived from a member of the human body, was an aliquot part both of the pace and the fathom, and was, moreover, portable, and, therefore, accessible on almost every occasion in which it might be demanded. The metre is a rod of forty inches, and therefore as inconvenient for the mechanic as the English yard; neither are the half metre or decimetre capable of supplying the advantages of the foot. The half metre is, indeed, equivalent to the cubit, but this antediluvian measure was in part discarded, on account of the more convenient shortness of the foot. But there were other difficulties. Every one is struck at the first glance of this system with the beautiful simplicity which it derives from decimal arithmetic. It appears, however, to have been overlooked, that although decimal arithmetic is admirably designed to facilitate the calculation of mere numbers, it is not equally well suited to the divisions of material substances. A line, weight, or measure, may be divided with the greatest ease, almost by the eye, into halves, quarters, and eighths, but the division into fifth and tenth parts is attended with much greater difficulty. Moreover, the decimal division is itself only divided by the numbers of two and five. So great are the advantages of the duodecimal division, divisible by two, three, four and six, that it was proposed, when the French theory was in contemplation and under discussion, to substitute the number twelve for ten as the term of the periodical return to the unit.

The leading features of the French and English systems of metrology are indeed very different. Of the latter, however, we see only the ruins of what was once a beautiful scheme, perfectly adapted to the nature of man, growing out of his wants, and improved from age to age, until it was nearly perfect. It was then unfortunately impaired by Edward I. when he destroyed the identity between the money weight and the silver coin by debasing the latter. The French system sprung into existence full-grown and perfect; it is the child of philosophy and civilization; and had those who were to employ it been as enlightened as its authors, they would not have wantonly annihilated all its just and beautiful proportions. The system of England derives its natural standard from the human foot, divided by the barleycorn; and the material positive standard is a three foot iron rod, deposited in the British exchequer.

To it belong two units of weight and two measures of capacity, the natural standard of which is the difference between the specific gravities of wheat and wine. The smaller of these weights was originally identical with the silver coin, a property now lost irrecoverably. These two pounds are standards of verification to each other, and are in the proportion of 144 to 175, the pound avoirdupois being 7000 grains troy. Twelve per cent are added to the English weights whenever a quarter of a hundred or more is weighed; thus 28 pass for 25, 56 for 50, &c.

This custom, it is said by Gray, originated with the Romans, allowing the merchants for waste 20 ounces to the pound at first, so that 100 pounds were 125 common pounds. The allowance was afterwards reduced to 18 ounces to the pound, making 112½ pounds for 100. The half pound is now omitted, and only 112 considered as 100 pounds weight. It is, however, supposed that the custom may have originated from the incapacity of the true hundred to be divided lower than 25 without a fraction.

The connexion of the linear measure in the English system with the weights, is by the specific gravity of spring water, one thousand ounces avoirdupois exactly filling the measure of a cubic foot. The division in this system of weights and measures is made without any reference to any apparently settled standard. The foot into twelve inches, the inch by law into three barleycorns, sometimes in practice into halves, quarters, eighths and twelfths, and sometimes into decimal parts.

The pound avoirdupois is divided into sixteen ounces, and the pound troy into twelve, so that while the ounce of the latter is larger, the pound is lighter than the pound avoirdupois. The ton in the English system is both a weight and a measure. As a measure, it is divided into four quarters, the quarter into eight bushels, the bushel into four pecks, &c. As a weight, it is divided into twenty hundreds of 112 pounds, or 2240 pounds avoirdupois. The gallon is divided into four quarts, the quart into two pints, and the pint into four gills, &c.

But in the English system the nomenclature is very objectionable, the same name being applied to different weights, measures, &c. Thus the term pound signifies two distinct weights, and a money of account; and indeed all over Europe this word is applied to weights of very different sizes. The gallon is used to denote two measures of unequal capacities, and which are not employed for the same purposes.

The French derive their standard from an aliquot part of the circumference of the globe; and the material rule is a platina metre in the national archives, decimally divided. There is but one standard for weight and one for measures of capacity, and, therefore, there is no common test of verification for both, as the litre gives the weight of water only. With the inconvenience of two weights and measures, the English system nevertheless has this advantage, that both the measures are a weight. Thus the gallon of wheat, and gallon of wine balance each other as weights. They each weigh eight pounds avoirdupois. This remark must be understood as applying only to the system as it was formerly, and not to its present condition. The difference between the specific gravities of wheat and wine is still the difference between the avoirdupois and troy weights, but not between the corn and ale gallons.

The French weight is not a coin, but the metallic coins are weights. Gold, silver, mixed metal, and copper, are all coined in weight, and relative value prescribed by law.

In the monetory system of the United States, every trace of identity between the weights and coins has vanished by the disuse of the terms pound and penny. Our coins are of prescribed weight and purity, but in no convenient or uniform proportions to each other.

The standard linear measure of the French system is connected with the weight and measure of capacity by the specific gravity of distilled water at its greatest density; one cubic decimetre of such water being the weight of the kilogramme, and filling the litre. To the divisions of this system, decimal arithmetic was exclusively applied by law; the binary was allowed as compatible with it, but all thirds, fourths, sixths, eighths or twelfths were rigorously excluded. This part is now abandoned, and the people are allowed the use of the duodecimal divisions. The nomenclature, too, though exceedingly beautiful and simple, has been thrown aside in practice. No two words express the same thing; no two things are expressed by the same word; but every word expresses the unit weight or measure which it represents, or the particular multiple or division of it.

On Moxas and their Preparations. By Elias Durand.

The employment of moxas as a remedial agent has, from time immemorial, been highly valued by the Chinese and other eastern nations. The Greeks and Egyptians were acquainted with it, and it is yet considered by the descendants of the latter as a sovereign *panacea.*

This medicine was introduced into Europe by the Portuguese, who were the first Europeans that penetrated into China and Japan. It was partially adopted by several continental nations; but the French became, especially, very partial to it, and have of late paid great attention to the improvements of their indigenous moxas. The English and American surgeons, on the contrary, preferring the employment of caustics to that of moxa, have rather neglected this subject, and little has been said by them respecting the nature and employment of this remedial agent. Hence the almost general ignorance of it in this country, among our surgeons and pharmaceutists, who are unacquainted with the medical literature of France; hence, also, the great difficulty, not to say impossibility, for those who have read or heard of the efficacy of this medicine in certain cases, to procure or prepare it for themselves, when an opportunity occurs of ascertaining the good effects it has afforded to other practitioners.

As unsuccessful calls for moxas are occasionally made in our stores, we have been induced to publish a short account of these preparations, with the expectation that, in a Journal like this, intended to promote the progress of the different branches of our art, it would find a suitable place, and would be acceptable to many of its readers. It is neither our intention nor department to discuss the merits or demerits of the actual cautery by moxa, or to mention the cases in which its employment has proved efficacious. We refer for this information to the works cited below, and shall confine ourselves to the task of giving a concise history of this remedial agent, and point out the better preparations used by the French as substitutes for the Chinese moxa.

The word *moxa* is of Portuguese origin, and signifies a match, on account of its likeness to this article. The Chinese call it *kiew*. When the Portuguese penetrated to China and Japan, they found the adustion by moxa so generally used among the Asiatic nations, that almost every individual was provided with his kiew. These people prepare their moxas by drying carefully, in the shade, the leaves of their indigenous mugwort, *artemisia chinensis*, a plant considered by botanists as a mere variety of the common European mugwort, *artemisia vulgaris*. When the leaves are perfectly dry, they separate the fibres and nerves, pound them up in the same mortar in which they grind their rice, until they are converted into a soft and silky *tomentum*, which is rolled up in small matches or twists, somewhat similar to our chewing tobacco.

That this *tomentum* is not, as was supposed, the down of the leaves of the mugwort, is satisfactorily ascertained by the very name of *kiew*, which, in the Chinese language, signifies *mortar*, and by the inspection of the plant itself, which is scarcely more tomentose in China and Japan, than the same plant cultivated in the botanical gardens of Europe. Besides, the Chinese moxas do not differ in any respect from those prepared in France by the process indicated above, either from the dry plant imported from China, from the same plant cultivated in Europe, or from the leaves of the common European mugwort. The appearance, softness, inflammability, and the property of burning slowly, are perfectly similar.

In the time of Hypocrates, the Greeks were acquainted with the adustion by moxa, which they generally performed by applying on the skin small cushions of raw or boiled flax. The father of medicine employed a metallic or box-wood spindle, previously plunged in boiling oil, and then applied it with force on the part where it was intended to produce an eschar. The compression to which this spindle was submitted produced a sinking of the skin in the form of a small cup, in which a few drops of boiling oil were poured, which, after standing a sufficient time in contact with the skin, afforded a complete cauterization.

Drs Percy and Clement have, in many instances, tried the effects of the latter method, and have found it to possess several advantages. They have since employed, with still more success, a small hemispherical spoon or box, made of a single piece of metal, in which they introduce a small quantity of spirit of turpentine, or alcohol of 30 degrees. After setting fire to the liquid, they apply the instrument, by means of a long stem or handle adapted to the spoon, on the surface to be acted upon, until the desired effect is produced. This application may be rendered rubefacient, catheretic, vesicating, or escharotic, as the case requires. Its action may be easily suspended, the instrument removed and applied again, or transferred to another part; in a word, its action may be variously modified, according to the degree of sensibility, or resolution of the patient.

The employment of moxa was also, for ages, familiar to the Egyptians, and is still among the poor the universal remedy for all kinds of disorders. Their moxa is prepared with cotton wrapt up in a band of linen, secured by a silk thread; its form is pyramidal or conical, with an aperture or air hole in the centre, and its length is from two to four lines; they apply it to the skin and secure it by means of an adhesive substance; then set fire to the top, taking care to keep constantly a piece of cold metal on the surrounding skin, in order to temper the heat and prevent the inflammation extending farther than the base of the moxa.

This Egyptian moxa has been frequently used by the French surgeons, but the necessity of blowing upon it to increase the flame, which otherwise would soon expire, becomes excessively troublesome and annoying to the operator. The offensive smoke produced by the combustion of cotton and linen powerfully irritates the eyes. Dr Larrey has, however, succeeded, by means of the blow-pipe, to use it with advantage*; but, in an unskilful hand, the blow-pipe is apt to increase the heat to too great a degree of intensity, and thus to produce too deep an eschar.

This great inconvenience of the Egyptian moxas has been removed by recurring to substances which, once lighted, burn of themselves, without the aid of ventillation or insufflation, with the mouth or the blow-pipe. The first self-burning moxas were employed in the French military hospitals; they were made with the common gun-match and answered remarkably well the purpose for which they were intended, &c.

The manner of preparing and applying them was neither long nor difficult, and the article never wanting in the army or garrisons. These moxas were performed by fastening the end of the inflammable cord with a small metallic wire, twisted two or three times round the match; then, with a knife, the cord was cut above the wire, so as to afford a cylinder two or three lines long, in the middle of which the wire is fixed, holding fast together the strands of the match. When a greater effect was wanted two or three cords were united together in the same way. This section of match was lighted at one end, applied to the skin by the other, and kept in its place with pincers. This moxa produces effects without interruption or assistance by insufflation from the bellows or blow-pipe, and burns to the end; the eschar produced is always of the same diameter, (the base of the moxa being of a uniform thickness), and frequently falls off in a single piece when suppuration is sufficiently established.

---

* Baron Larrey's moxa is about one inch long, and of a proportional thickness. It is applied by means of an instrument called *porte-moxa*, moxa bearer, composed of a metallic ring furnished with a handle, supported by three small pieces or feet of ebony wood (a bad conductor of caloric) which prevent the ring from coming in contact with the skin. The moxa is fixed inside of the ring. The part intended to be burnt is marked with ink, and the surrounding parts are covered over with a wetted rag, having a hole in the middle, to leave naked the part covered with ink. The moxa is then lighted and applied. The wetted linen preserves the skin from the sparkles produced by the insufflation by the blow-pipe. In order to prevent a deep inflammation and a too great suppuration from taking place, Dr Larrey washes the burnt part with spirit of hartshorn or Cologne water.

The self-burning moxas are now pretty generally used in France, but the gun-match is no longer employed. They are made of cotton impregnated with nitre. This cotton is prepared by suspending one pound of this substance in an earthen pot, with a cover both perfectly glazed inside, and containing a solution of two ounces of nitre in two quarts of water. In this state the cover is well luted, and the pot kept for several successive nights on the warm ashes, when the fire is covered, or in an oven with the bread, until all the water is evaporated and the cotton perfectly dry. It is then either rolled up upon a small rope or cylinder of linen, until it has acquired a sufficient size, and the form of a cone several lines long, or wrapt up in a piece of linen in the shape of a cylinder, of which, when required, a section of an appropriate thickness is cut with a sharp razor, and applied to the skin in the same manner as the preceding. The moxas called by Dr Percy *poupées de feu,* are prepared in the same way as the Egyptian moxa cited above, with a hole in the centre to facilitate combustion, but they are made of cotton impregnated with nitre. Their combustion is very rapid, and they are employed in cases where a deep impression and a more considerable eschar are intended. All these different moxas are secured on the skin by a piece of adhesive plaster cut crossways in the centre, or by a piece of metallic wire or pincers.

Some animal substances, such as silk, wool, &c. might also form good moxas, were it not for the strong ammoniacal smell they emit during their combustion. Every vegetable substance capable of being penetrated by nitre, may be employed for this purpose. The pith or *meditullium* of several plants is well calculated to afford good moxas; that of the

The preparations made from the erythræa centaurium may be advantageously imitated with the sabbatia.

Extractum Sabbatiæ.

℞ Herbæ sabbatiæ recentis	℔j.
Aquæ	℔vj.

Digest for twenty-four hours, then boil for a quarter of an hour, press out the liquid, and evaporate with a gentle heat to the consistence of an extract.

Extractum Alcoholicum Sabbatiæ.

℞ Herbæ sabbatiæ recentis	℔j.
Aquæ	℔v.
Alcoholis diluti	℔ij.

Digest with a gentle heat for three days in the alcohol, and press out the liquid, then boil the herb in the water for a quarter of an hour, and evaporate the expressed liquid; towards the end of the evaporation add the alcoholic tincture, and continue a gentle heat until it is reduced to a proper consistence.

Tinctura Sabbatiæ.

℞ Herbæ sabbatiæ	℥iv.
Alcoholis diluti	℔ij.

Digest for six days and filter.

Infusum Sabbatiæ.

℞ Herbæ sabbatiæ	ʒvj.
Aquæ bullientis	℥vj.

Digest in a covered vessel and strain.

Decoctum Sabbatiæ.

℞ Herbæ sabbatiæ	℥j.
Aquæ	℔j.

Boil for a quarter of an hour and strain.

Notice of Iron found in the Powder of Cinchona Bark.

By Charles Ellis.

A circumstance occurred with a highly respectable house in Baltimore, to which we are indebted for a knowledge of an accidental impurity in the powder of cinchona, which is believed to be of sufficient importance to interest the readers of the Journal.

An ounce of calisaya bark *in powder* was procured of them, and directed by the physician to be made into a decoction. The liquid when decanted was nearly the colour of ink. A second ounce was obtained and infused in an earthen vessel, with precisely the same result. The conclusion was, either that the bark or the water contained iron; and to determine to which of these causes to assign this change of colour, and to ascertain whether the bark were really impure, these gentlemen submitted it to the following experiments, viz. 1. A small quantity of the powdered bark was examined by the aid of a microscope, and the whole surface found studded with small metallic specks, some black, some bright, giving it quite a lustre. 2. A quantity of the powder was boiled in a Florence flask with distilled water. The decoction was of a deep black colour, taste similar to ink and entirely devoid of the sensible properties of a decoction of pure cinchona; suffered to stand, the supernatant liquor was of a grayish blue colour, and the precipitate of a dark brown, approaching to black. 3. A quantity of the powder was exposed, in a shallow vessel, to a stream of water, so as to wash away the lighter particles, and the deposit left in the bottom of the vessel consisted of small black grains of a metallic lustre. The inferences drawn from these experiments were, that the powder contained a metallic substance which proved to be iron; and that the precipitate in the decoction was owing to the action of the components of cinchona upon the iron.

These results led to an examination of other parcels of powdered bark; and in upwards of twenty different samples examined by my friend John Farr, and a number by myself, there were none in which the magnet did not detect minute particles of iron; in some much fewer than in others.

In order to ascertain the amount of impurity in a given quantity of bark, I washed carefully half an ounce of the same lot used in Baltimore, and obtained one grain of iron in a metallic state: there was perhaps from a fourth to half a grain lost in the operation. From one ounce of another parcel there was half a grain separated by the magnet.

It will be readily perceived, from the nature of this admixture, that it was entirely accidental, and fortunately not of a character calculated to do any injury.

Inquiry having been made of the powderer, it was ascertained that his machinery does not materially differ from that in general use; that the revolving stone is shod with iron, and passes over a cast-iron plate—a sufficient cause for the existence of minute particles of iron in the powder, particularly as in this instance the bark was not dusted, a process by which the impalpable powder is separated from the heavier and coarser particles.

Although it is not probable that the quantity of iron found in this cinchona would render it objectionable in many cases, still it is desirable at all times to have our remedies free from all foreign admixture—that the physician may know precisely what he is directing, and the patients may neither be alarmed nor disgusted with unexpected, and to them unaccountable changes. From the well known hardness of the French burr stones, we may readily conclude that bark might be ground by them without the fear of adulteration.

It may be observed, in passing, that barks, roots, &c. of nearly every kind, are more eligible for decoction or infusion when coarsely powdered, or bruised, as it is technically called, than when reduced to an impalpable powder.

On Aromatic or Spiced Syrup of Rhubarb. By Elias Durand.

Dr Coxe, in the last edition (1830) of his American Dispensatory, has very judiciously observed that this syrup, prepared agreeably to the Pharmacopœia of the United States, possesses a defect which may be easily obviated, without changing the proportions of its ingredients. In fact, evaporating to one half an infusion of rhubarb and aromatic substances is quite inconsistent with the present improvements in pharmaceutical manipulation; it is too well known that these articles lose by ebullition a great portion of their active properties.

This fault, as well as many others which have crept in that national work, has not escaped the attention of our practical pharmaceutists. From the first time I had to compound the aromatic syrup of rhubarb, this defect struck me, and I amended the formula by the following, which undoubtedly affords a preparation very superior to the other, both in nicety and activity. I first prepare an alcoholic tincture with the rhubarb and the aromatic ingredients, and then form my syrup by the addition of a relative quantity of simple syrup.

Aromatic Tincture of Rhubarb.

℞ Rhubarb of good quality	parts v.
Cloves and cinnamon, of each	parts iv.
Nutmegs	part i.
Alcohol of 20°	parts lxiv.

Bruise the ingredients and macerate them for about a week.

Aromatic Syrup of Rhubarb.

℞ Aromatic tincture of rhubarb	part i.
Simple syrup of 35°	parts iii.

Mix well. This syrup marks 28° on Baume's pèse syrup.

Selected Articles.

On the Fermentation of Opium applied to the Extraction of Morphia. Read at the Royal Academy of Medicine, Section of Pharmacy, by A. Blondeau, Pharmacien.

[We have already published such short notices of this gentleman's method of separating morphia as came to hand in the French periodicals. We find in the Journal de Chimie Medicale, &c. for February, an account of the process fully detailed, accompanied by a report on the comparative merits of this process and others, made by a committee of the academy, viz. MM. Guibourt and Robiquet. We shall give the whole of it a place in our Journal, as the experiments and observations of these distinguished chemists must prove interesting on the subject of opium, which may be considered as still unsettled and open to investigation.]

M. Blondeau observes of his process, that it offers the advantage of affording a larger product, but that it is to be considered as only preliminary to the extraction of morphia, it being always necessary to complete the operation by one or other of the methods proposed by preceding chemists. For this purpose he selected that by acids, observing at the same time that, in the different experiments, he had procured results nearly as advantageous by following exactly the plan proposed by his colleague and friend M. Hottot.

Process.—Select the best opium, divide it conveniently, and introduce it into a vase with a large opening; cover this with twice its weight of warm water, in a portion of which a small quantity of the yest of beer and honey have been introduced.

Fermentation is soon established in this mixture when placed in a stove heated to 20 or 25° Cent. This terminates at the end of eight or ten days, and the liquor exhales a well pronounced alcoholic product. This is squeezed through a linen bag, and the residue washed several times and then expressed.

These liquors, when reunited, are reduced by evaporation to a proper quantity, and when cold a slight excess of ammonia poured in. The precipitate, after being washed in cold water and dried, is to be powdered and treated with water slightly sharpened with hydrochloric acid. This liquid assumes a brownish yellow colour, and when, after some hours of contact, the saturation is complete, and the colour is no longer deepened, it must be filtered and evaporated until it assumes the form of a tolerably solid mass on cooling. This hydrochlorate of morphia is considerably coloured, but washed with cold water on linen, and heated afterwards with boiling water and animal charcoal, it crystallizes in silky needles of a beautiful pearly-white colour. We obtain the morphia from this hydrochlorate by pouring into its aqueous solution a slight excess of water of ammonia. The morphia is precipitated in the form of a granulated powder, of a light umber shade, but which dried with care presents the appearance of crystals, the brilliancy of which is apparent when exposed to the rays of light. Morphia thus obtained is very pure, and can be employed for all medicinal purposes; it is, therefore, unnecessary to crystallize it by means of alcohol, more especially as in this form it is much more soluble in acids, owing to its slight cohesion.

The same opium has been treated, for the sake of comparison, by the process of MM. Henry and Plisson, and that above detailed, and the quantity of morphia extracted by the latter, has always been greater than that furnished by the former, in the proportion of eight to five. These are the mean proportions of many comparative operations. M. Blondeau observes that the advantages resulting from this modification are sufficient to render it worthy of notice, since the expense of the operation is not augmented, and the length of time necessary to complete it but little increased.

How does fermentation act in this case? I am induced to believe, he observes, it is by the resin, extractive, or other colouring substances of the opium undergoing such a decomposition that they are incapable of retaining afterwards the morphia with any degree of force. Thus disengaged, it can be separated with much greater facility; and we obtain probably the whole of that which exists in the opium, whilst by the ordinary processes a part of the alkali remains dissolved in the liquors and cannot be isolated. It is this which occasions the difference of the product in the two cases.

Report made to the Royal Academy of Medicine on a process proposed by M. Blondeau for extracting Morphia. By MM. Guibourt and Robiquet.

As this report is long, we shall take the liberty to condense it as much as may be consistent with clearness. These gentlemen observe that there may be said to be a good and a bad side to each of the methods proposed as modifications of that originally suggested by Sertuerner for the preparation of morphia; and that by practical skill in any one of them, it is possible to derive advantages from it which the others do not afford. The greatest difficulty is to separate the morphia from the colouring matter which accompanies it, without sacrificing a considerable quantity of the alkali. But whatever may be the mode of precipitation employed, it is always possible to separate the last portions by recourse to certain *tours de mains*, sleight of hand, or practical skill, which is the peculiar property of adepts. To obtain a method by which *all* should be able to secure this base, ter were enclosed in the same stove and in a similar apparatus for eight days, but the lime water designed to absorb the carbonic acid was not sensibly affected.

It results from these experiments that no carbonic acid is evolved from yest alone, dissolved in water and exposed to heat; and that a simple solution of opium in water, exposed to heat, does not afford any carbonic acid gas.

But, that opium and yest mingled in the same solution, disengage a considerable quantity of this gas, though no trace of alcohol could be detected by distilling the liquor. Are we to suppose that this product is completely converted into acetic acid; or must we conclude that opium contains no sugar, and that the yest has been able to act on some other principle of this narcotic? This point we are unable to decide.

Another consequence of the fermentation of opium, or of its prolonged immersion in water, and which appears to be independent of the action of yest, is the complete destruction of the tenacity of the residue, its diminished weight, and the relative augmentation of the soluble matter or extract. Thus opium alone, treated cold, produces but eight ounces five gros of extract; opium and yest nine ounces one gros, and opium fermented *alone* nine ounces four gros. This relative augmentation remains after dissolving the three extracts in cold water. Thus the first is reduced to seven ounces seven gros sixty grains, soluble matter; the second to eight ounces three gros twenty-four grains; the third to eight ounces five gros.

Precipitation by Ammonia.

The three preceding extracts were each dissolved in nine pounds of cold water, and into each one gros of liquid ammonia was poured, which at first occasioned a slight disturbance. But the first and the third became clear again by agitation; whilst in the liquor, No. 2, was formed a black glutinous matter, reduced by exsiccation to half a gros. No account was taken of it in the following results, but it certainly contained a small quantity of morphia.

The three liquids brought to the same point, were each precipitated with an ounce of ammonia. After the lapse of two days they were filtered, acidulated with sulphuric acid, concentrated, and precipitated again. These are the results:

		1st Precipitate.		2d Precipitate.		Total.	
		Gros.	Grains.	Gros.	Grains.	Gros.	Grains.
No. 1.	Opium not fermented,	27	12	00	48	27	60
No. 2.	Opium fermented with yest,	29	48	00	120	31	24
No. 3.	Opium fermented alone,	27	00	00	48	27	48

The last precipitates were very much coloured, and were not added to the first, though it is necessary to estimate them in order to ascertain the total amount of impure morphia that opium yields. We may remark that the extract No. 3, the most abundant of all, in consequence of the disappearance of the insoluble matter of opium, was that which furnished the least morphia. From which it appears that this insoluble matter does not transform itself into morphia, as some have supposed, but that it may be made to dissolve with the other principles of opium by the agency of heat and time. It is probable that the explanation of the increase of morphia in No. 2, given by M. Blondeau, may be in part correct, viz. that the resinous portions and other colouring matters suffer such a decomposition during the fermentation, that they are incapable of retaining the morphia with much force. Nevertheless, we think it very probable, that the acid generated in the process contributes essentially to loosen the morphia from its associations, which certainly is not confined to meconic acid alone. We may also presume that the morphia precipitated by ammonia, from a solution of opium, is not in a free state absolutely; for we have long known that the addition of an acid favours, singularly, the separation of organic bases, which would not be the case if they were combined perfectly in the original compound with acids.

But the product by fermentation is not so advantageously large as it appears to be at first, since it disappears, in part, by subsequent purification.

Thus the first precipitate obtained from No. 1. weighed 27 gros 12 grains, and was reduced by purification to 24 gros 16 grains; diminution 2 gros 68 grains.

The first precipitate obtained from opium, fermented with yest, weighed 29 gros 48 grains, and was diminished by the process of bleaching to 24 gros 48 grains; diminution 4 gros.

But as it would be unjust to judge of M. Blondeau's process by the preceding experiments, which were not conducted with sufficient accuracy, we have submitted a kilogramme of opium to ordinary treatment, and another to that proposed by M. Blondeau. These are the results:

Ordinary process, impure morphia, six ounces four gros.
M. Blondeau's process, impure morphia, eight ounces one gros.

The same superiority in favour of the new process is always apparent; but if, as our colleague prescribes, we treat this impure product by hydrochloric acid, and subject it to all the operations necessary to purify it, this advantage always vanishes, and the precise results of the two processes are nearly the same. Convinced, therefore, that the treatment by hydrochloric acid does occasion a loss of the morphia, we have submitted a fresh quantity of opium to fermentation, and purified the product in the ordinary manner. In this way we obtained two ounces four gros thirty-six grains of pure morphia from a kilogramme of opium, whilst the same quantity of opium only furnished two ounces three gros by the ordinary method; making one gros and a half in favour of the process by fermentation to the kilogramme. To which may be added the advantage, that the product by the new process is more easily purified. We therefore think that the process by fermentation proposed by M. Blondeau, but in which we would substitute the purification by alcohol, for the treatment by hydrochloric acid, presents a real advantage. And we have the honour, in consequence, to propose to the academy to address a vote of thanks to this gentleman for his communication.

We would observe in closing, that some years ago one of us announced having taken advantage of fermentation for the extraction of strychnia.

This plan succeeded perfectly when properly employed; nevertheless, it failed entirely in the hands of other chemists. But there is, without doubt, in this, as in many other operations, a *modus faciendi*, on which success depends.

B. E.

On Kinic Acid and its principal Combinations with Salifiable Bases.

MM. Henry, fils, and A. Plisson, pharmaciens attached to the central pharmacy of the civil hospitals, read a memoir on the subject of the kinic acid and its salts, before the Royal Academy of Medicine, Section of Pharmacy, 18th of July 1829.

It is not our intention to give a complete translation of this interesting monograph; but we shall present a concise view of the researches and results of these distinguished chemists.

Kinic acid may be procured by several processes, but it is necessary, in the first place, to obtain the kinate of lime, viz. reduce over the naked fire, nearly to the consistence of a clear syrup, the reddish liquors which result from the decomposition of the sulphuric decoctions of yellow cinchona saturated with lime. Decant the liquor in order to separate the calcareous sulphate that is formed, and reduce it afterwards to the consistence of a soft extract over a water-bath. This product, abandoned to the open air, frequently assumes the form of a pulpy mass, occasioned by the confused crystallization of the kinate; but as it is very difficult to separate this salt, it is better to treat this extractiforme matter, while hot, two or three times with the alcohol of commerce. The part insoluble in this menstruum dissolves in a small portion of pure water, and does not interfere, especially if the temperature has been a little elevated, with the formation, at the end of a few days, of a thick granular magma. This strongly expressed and submitted to different crystallizations, furnished the kinate of lime perfectly white and very pure. Fresh crystals may be procured from the mother-waters by proper condensation.

The kinate of lime may also be procured by decolouring the sulphuric decoctions of gray or yellow cinchona with the hydrate of lead. This process may be referred to at length in the 13th volume of the Journal de Pharmacie. The excess of lead is to be removed by hydrosulphuric acid or diluted sulphuric acid, added carefully. Lime is then to be added to saturation, the compound filtered, evaporated, and the kinate of lime will crystallize. This mode is more prompt, but a little less economical than the preceding.

It is from the kinate of lime procured by one or other of these processes that the kinic acid is prepared. This acid may be obtained in several modes; that recommended by M. Vauquelin is very direct, viz. add oxalic acid to a solution of the salt very carefully, until precipitation ceases; filter and crystallize.

Or, dissolve some kinate of lime in a small portion of water, and add to it, in slight excess, some sulphuric acid, diluted with three or four times its weight of rectified alcohol. Deprive the liquor of sulphuric acid by the addition of baryta or kinate of this earth; filter and evaporate with a gentle heat. The kinic acid will be procured in crystals very white and very pure.

Or, treat with sulphuretted hydrogen the sub-kinate of lead dissolved in a given quantity of water. After the concentration of the clear liquor, the kinic acid will crystallize, which must frequently be purified by a second crystallization.

Or, lastly, decompose the kinate of baryta by sulphuric acid, added drop by drop, and evaporate the filtered product. The kinate of baryta can be easily obtained by adding a warm solution of kinate of lime in alcohol of 25° to an alcoholic solution of muriate of baryta. The muriate being in slight excess, the kinate of baryta will precipitate. Wash this salt in rectified alcohol until the muriate is removed, and then dissolve it in pure water.

Kinic Acid.

This acid, when pure, is in the form of crystals, tolerably large, handsome and transparent. Its taste is very acid, not disagreeable, and without any bitterness; the specific gravity at 8½° is 1.637, water being 1. Exposed to the air in a perfectly dry state, it remains unaltered, but dissolved in water, it becomes covered with mould like the vegetable acids. It assumes, when first melted, the form of a colourless liquid, afterwards it decomposes, and a brown matter results with carbonic acid gas, which resembles in its odour the burning tartrates; a light voluminous charcoal remains. When the volatile products of this decomposition are collected, a white substance is obtained in small crystals, that MM. Pelletier and Caventou discovered, examined with care, and pronounced to be a peculiar acid, which they denominated *pyro-kinic.*

Kinic acid is soluble in alcohol and water. It dissolves at a moderate heat in about two and a half times its weight of water, and when boiled in it with fecula for a long time, is converted into sugar. Subjected to the action of alcohol under proper circumstances, a peculiar substance results, which has a great analogy with the tartaric ether of M. Thenard, and which is presumed to be *kinic ether.*

Treated with hot sulphuric and nitric acids it is changed; with the first it furnishes a peculiar green substance, and then carbonizes; with the second, oxalic acid is the result; and if the proportion of nitric acid be less, a peculiar acid matter is furnished, having some resemblance to the ***pyrokinic*** acid. Is it an acid more oxygenated?

It forms, with organic and inorganic bases, compounds, for the most part very crystallizable, and in definite proportions. They are denominated kinates.

All the combinations we have made are soluble with the sub-kinate of lead, already noticed by MM. Pelletier and Caventou.

By destructive decomposition one gramme of kinic acid, very pure and dried with care at 100°, gave for 100 parts,

Carbon	34.4320
Hydrogen	5.5602
Oxygen	60.0078

This, according to theory, induces us to consider it as composed of

Carbon	34.1149	2 atoms,
Hydrogen	5.5602	4 atoms,
Oxygen	60.3249	3 atoms.

The atomic weight of this acid will be consequently equal to 477.8342.

Of the Kinates.

These salts are all neutral; one only has been obtained in the state of a sub-salt, but not one hitherto with excess of acid. No double salts have yet been procured, at least in the crystalline form.

All the neutral kinates are soluble in water, less so in alcohol, especially if it is highly rectified; they crystallize sufficiently well for the most part, but always slowly and by spontaneous evaporation. They fuse and dry into a kind of varnish, which is slightly deliquescent, though this does not hinder them from assuming a crystalline appearance. Their taste is very variable, and they are destitute of odour.

The kinates may be prepared by a direct combination of the base with the acid, or by a double decomposition with the kinate of baryta and a soluble sulphate. In this manner may be procured, in very constant proportions, the kinates of magnesia, soda, potassa, copper, zinc, manganese, quinia and cinchonia. All these are neutral salts, and the authors state that they have performed the most elaborate and exact experiments in the destructive analyses of these salts, in order to ascertain their composition, and proportion of base and acid. From numerous experiments, they observe, made for this purpose, we have ascertained that in this species of neutral salts, 100 parts of acid will saturate a proportion of oxide containing 4.299 of oxygen. This would be double in the salts with a double base (sels bibasiques), and one half less in the double salts (bisels); also, that in the neutral kinates the quantity of oxygen of the base is to that of the acid as 1 to 14.03. We shall not translate the short account given to the mode of forming, and the composition of these individual salts, as they would have but little interest for the general reader, and would occupy too much of our space. The essential febrifuge salts of the cinchonas, however, are interesting to all of us, and of these we shall say a few words. It is the opinion of these gentlemen that the kinic acid exists in combination with quinia and cinchonia in the cinchona bark. They have even isolated these neutral salts, but not in that state of purity which is desirable to establish the absolute truth of the proposition. They have prepared them artificially:

1. By carefully saturating the kinic acid with pure quinia or cinchonia, recently precipitated in the state of hydrates.
2. By decomposing their sulphates with the kinates of baryta or lime. (It is necessary, in the latter case, to employ alcohol of 32° in order to isolate the sulphate of lime, and the excess of calcareous kinate). Crystals may be procured by evaporating the liquids at a regulated temperature.

Kinate of Quinia.

This salt is very soluble in water, a little less so in highly rectified alcohol, and possesses a bitterness which strongly resembles that of the yellow cinchona. Its crystallizations are accomplished by a species of white circular crusts, sometimes lightly needle-shaped, but more frequently knobbed; these crusts, dried in the air, remain opake, either efflorescent, or assuming sometimes a horny aspect on the edges.

The neutral kinate of quinia sensibly turns the syrup of violets. When some drops of kinic acid are added to this, the crystallization becomes more needle-form. We have not ascertained if there exists an acid kinate, which is probable.

Note.—In order to prepare this neutral salt, it is necessary to employ materials that are *exceedingly pure*, otherwise the result will be a greenish yellow salt, very difficult to decolourize. The composition of the kinate of quinia is

Acid	100
Quinia	194.2

Kinate of Cinchonia.

This salt is more soluble than the preceding; the bitterness has something more of astringency, and the crystallization is less readily accomplished, as the liquor, thickened to a syrup, remains for sometime without changing its aspect. After several days little radiated tubercles are manifest, which unite and form a mass of needle-shaped crystals in the centre, of a pearly silk-like appearance, on which the air has no action when they are dry. Heat decomposes them entirely, and they indicate all the characters of the salts of cinchonia. Composition,

Acid	100
Cinchonia	165.4

In order, to determine the composition of these kinates, the authors pursued an indirect mode, which furnished very accurate results. Knowing, in the first place, the composition of the kinate of baryta, and the sulphates of quinia and cinchonia, they valued very exactly the proportion of the sulphate of baryta formed by the reciprocal decomposition of these salts. The weight of baryta being known, they deducted that of the kinic acid and sulphuric acid combined with the quinia or cinchonia, whence it is easy to arrive by calculation at the analysis of the kinates with organic base. Thus, according to the general laws which govern the reciprocal decomposition of salts, 100 of dry sulphate of quinia give

Sulphuric acid	9.85
Quinia	90.15

which will produce sulphate of baryta 28.94, or of baryta 19.09, and represent kinic acid 46.4, to saturate the above quantity of quinia.

Ten parts of kinate of quinia correspond with 7.3 of neutral sulphate of quinia, for the proportion of alkaloid, and ten parts of kinate of cinchonia with seven of the sulphate of the latter base.

The authors conclude this interesting memoir by some speculations on the probable superiority of the kinates of these alkaloids over the sulphates, hydrochlorates, &c. They state that an equal quantity of quinia will prove more efficacious, united with the kinic than with the mineral acids. 1. Because the kinate of quinine exists in the Peruvian bark. 2. Because the chemical action of the kinic acid on the quinia is not so powerful as the others, and, therefore, it furnishes a salt in which the alkaloid is in its greatest degree of force. 3. Because the kinic acid saturates more feebly the febrifuge virtues of the quinia than the sulphuric and other mineral acids. They support this opinion by the assertion of Dr Bailly, who conceives he has established by numerous experiments the superiority of morphia combined with acetic over that combined with sulphuric acid. 4. Finally, they conceive their judgment will not prove erroneous that the kinic acid is better calculated than any other, to give quinia the capacity for developing its highest degree of medical action. (We should be very glad to have an opportunity of exhibiting quinia in combination with the acid which nature has joined to it in the cinchona bark. As the sulphate so frequently disappoints us, our apothecaries would do well to procure some of the kinate.) B. E.

A Botanical Notice of the different Genera and Species whose barks have been confounded under the name of Cinchona. By Prof. Decandolle. Translated for the Journal of the Philadelphia College of Pharmacy, from the Bibliotheque Universelle, (vol. 41. p. 144,) by John H. Griscom.

Whenever a name has become illustrious, all who have the least right hasten to assume it; whenever one portion of the earth becomes celebrated for the quality of its productions, all the neighbouring proprietors are anxious that their territory should belong to this quarter. Thus it has happened with the cinchonas. After the celebrity of this bark had become established, all the febrifuge barks of America were, by degrees, endowed with the name of cinchona, and every traveller who discovered a shrub somewhat analogous to the genus cinchona, was desirous that the species should appertain to a genus upon which public attention was so much disposed to dwell. More attentive observation, however, has shown that a great number of substances, more or less different, has been collected under the name of cinchona, and although many of these errors have been partially removed, it will probably not be uninteresting in this place to take a hasty survey of the true cinchonas, and of the substances improperly confounded with them.

This examination may be somewhat interesting, not only because we shall obtain a more precise knowledge of the objects about which we are continually speaking, but also because a more exact knowledge of these plants may illustrate the materia medica. We shall find in this review a memorable example of those affinities of properties which the species belonging to neighbouring genera present, and which go on increasing in the species of the same genus; we shall here see how necessary it is to notice with precision the substances whose analyses have been given by chemists, or with which physicians make their experiments, for without this precision in nomenclature the greater part of other labours is rendered inaccurate, and loses much of its utility.

It is well known that the Peruvian bark has been employed in America as a febrifuge from the earliest period; but that it was not known to Europeans prior to the year 1638, the time when the countess of Cinchona, wife of the viceroy of Peru, was cured of a fever by this medicine, and made it known in Spain, where it obtained the name of the *Countess's powder*, which the public gave to the pulverized bark, and that of *Cinchona*, which botanists bestowed upon the tree which produces it. But although the use of this medicine has spread far and wide, a century elapsed before any particulars of the tree which bears this precious bark became known. It was not until 1738 that La Condamine published in the Mémoires de l' Académie de Paris, the description and figure of this tree, which he found in the suburbs of Loxa. Since that time MM. Ruiz and Pavou, in their voyage to Peru; M. Mutis in his laborious excursions around Santa Fé de Bogota; MM. de Humboldt and Bonpland in their admirable tour in America, have brought to light many species of cinchona, and have thus proved that the bark denominated Peruvian, is not obtained from a single tree, but from many proximate species. Soon after, analogous researches made in the Antilles by Badier and Richard, in Brazil by MM. de St Hilaire and Pohl, in the Indies by

Roxburg and Wallich, proved that vegetables very like the preceding existed in different countries, and were often confounded under the same names. We now reckon no less than eight genera which have been mingled under the name cinchona, and these genera contain forty-six species, of which all the known barks appear more or less endowed with febrifuge powers. We shall endeavour to point them out succinctly; remarking, in the first place, that all these genera appertain to the extensive family of Rubiaceæ, and to the tribe of this family which bears the name of Cinchona, and which is characterized, 1, by its fruit having two cells, dehiscent, and polyspermous; 2, by its seeds edged with a membranaceous wing. They are all trees or shrubs with opposite leaves, furnished with intermediate stipules, and a corolla in form of a funnel or saucer, always having five lobes and five stamina.

I. *Cinchona.*

The first rank in this enumeration properly belongs to the true genus cinchona. It is very readily distinguished, 1, by its stamina being entirely concealed in the tube of the corolla, and never projecting; 2, by two little pods adhering to the calyx, which compose the fruit, separating from below upwards, by the doubling, in a singular manner, of the partition which divides the capsule into two compartments; 3, by the seeds being erect and imbricated from below upwards; 4, by the border of the calyx being toothed one-third or half its length, and rising to the top of the capsule. There are at present sixteen known species which belong to this genus, but it is said that Peru and Colombia, of which countries they are all natives, contain a much greater number, which have yet been observed only by Mutis; and it is known that the immense labours of this philosopher are yet unpublished. Those of which I shall here speak are known by authentic specimens, either of flowers and fruits, or of barks, which are obtained from the very authors who discovered them, a very important circumstance, which I hope will give some precision to this work.

The greater part of the cinchonas have the external part of the flower hairy, and all the species truly important in a medicinal view belong to this division of the genus; such are,

1. *Cinchona condaminea* (Humb. Pl. Equin. Vol. I.) which grows near Loxa, where it is known by the name of *cascarilla fina*, or *quinquina de Loxa.* Its bark is rolled, gray without, with a yellow tinge within, and there flows from it during the life of the plant a yellow and bitter juice. This is the kind which passes for the most energetic of all. Its infusion may be known, according to the researches of M. Vauquelin, by its precipitating isinglass in large flakes; it precipitates likewise galls, tartar emetic, and the acetate of lead. It is frequently confounded in Europe with the other cinchonas of a gray colour, which are of an inferior quality. This species, discovered by La Condamine, and found again by Humboldt, is wanting in the Flora of Peru, but I found it in a herbal sent by M. Pavou to MM. Dunaut and Moricaud, under the name of *Cinchona vritusina*, and a variety with large leaves under that of *C. chahuarguera.* These are probably two common names of this plant in Peru.

2. The *Cinchona scrobiculata* (Humb. Pl. Equin. pl. 47.) grows near St Jean de Bracomoros, where it bears also the name of *Cascarilla fina.* Its bark is of a reddish brown, and is one of those which are named *red cinchona* in the pharmacopœias; its juice is yellow and astringent. It passes for one of the better kinds, but is less common than the following. Its infusion, according to M. Vauquelin, precipitates isinglass, tartarized antimony, and tannin, but reddens the tincture of turnsole. This kind appears to have been mingled with the following in the Flora of Peru. I have received from M. Pavou a bark very much like this under the name of *Cascarilla colorada.*

3. The *Cinchona lancifolia* (Mutis) grows in the cool parts

of the Andes; its bark is gray without, and of an orange yellow within. It is this which produces principally the *orange cinchona* of the European pharmacopœias. It is impossible that there should be two distinct kinds confounded under this name. The *C. nitida, lanceolata,* and *angustifolia* of Ruiz are cited here as simple varieties. The *Cascarilla lampinio* and *amarilla de munna* of Spanish America are likewise included in it.

4 The *Cinchona pubescens* (Vahl. Act. Soc. Hafn. V. I. pl. 2.) grows at the foot of the Andes in Peru, and on the mountains of New Grenada. It is easily recognized by its leaves being hairy beneath. Its bark is yellow externally, and it goes by the name of *yellow cinchona* in the European pharmacopœias. Its infusion is of a golden yellow, and becomes green by sulphate of iron. It precipitates tartar emetic and nitrate of mercury. This species was discovered by Joseph de Jussieu in 1738, and has received different names, such as *C. cordifolia,* Mutis; *C. officinalis,* Gœrtn; *C. pallescens,* Ruiz; *C. hirsuta,* Fl. Per. &c. It is one of the most extensive. The barks known by the names of *Cascarilla pallida, Quina amarilla,* belong to this species. The *Cascarilla delgado,* or *Cascarilla de pillao,* which is the *C. tenuis* of the quinology of Ruiz, appears to be taken from the very young branches of the variety β of this species, *Cinch. hirsuta* of the Flora of Peru.

5. The *Cinchona purpurea* (Fl. Per. pl. 193.) is perhaps only a variety of the preceding or neighbouring species, distinguished by its leaves being membranaceous and coriaceous, almost glabrous, and by its fruit being rather longer in proportion to its breadth. Its bark is known in America by the name of *Cascarilla bobo de hoia morada.* The *C. morada* of Ruiz, and perhaps his *C. coccinea* are here united.

6. The *Cinchona Humboldtiana* (Ræm. and Schuldt) which is figured in pl. 19 of the Equinoctial Plants, under the name of *C. ovalifolia,* but which is not the one bearing the same name in the "Flore du Pérou" is found near Cuença, but is

not yet known in commerce, although it appears to be of a good quality. I have received some of its bark from M. Bonpland, under the name of *yellow cinchona of Cuença.* It is called at Cuença *Cascar. peluda.*

7. The *Cinchona magnifolia* (Fl. Per. pl. 196.) grows in the forests of the Peruvian Andes, and in New Grenada; it is known there by the name of *Quina roxa,* and of *flor de ahazar;* it is the same as the *Cinch. lutescens* of Ruiz, the *C. grandiflora* of Poiret, and the *C. oblongifolia* of Mutis. Its bark is of an ash-brown without, and somewhat red within; bitter and acidulous. It is little used in Europe, except when mixed with others, and chiefly the red.

8. The *Cinchona macrocarpa* (Vahl. Act. Soc. Hafn. V. I. pl. 3.) is remarkable for its pale bark, whence it derives its name of *white cinchona.* It is not sent to Europe. The other species of this genus are too rarely employed to merit a detail in this place. Among these species there are some whose botanical relations are at the present time well known; such are,

1. The *C. macrocalyx* of Pavou (quinol. edit.), with which I became acquainted by the specimens sent by this botanist to MM. Moricaud and Dunaut. 2. The *C. crassifolia* of Pavou, with which I became acquainted in the same manner. 3. The *C. dichotoma* of the "Flore du Pérou." 4. The *C. acutifolia* of the same work. 5. The *C. micrauha,* which, notwithstanding its vulgar name of *Cascarilla fina,* is little employed. 6. The *C. glandulifera* of the Flora of Peru, or *glandulosa* of Ruiz. 7. The *C. caduciflora* of Humboldt and Bonpland. 8. The *C. rosea* of the Flora of Peru, or *Cascarilla pardo* of Ruiz. 9. Lastly, the *C. pelalba* of Pavou, a beautiful species which I have seen in the Herbarium of M. Moricaud.

Besides these species known to botanists, there is a great number of barks in the different collections, and I have seen, in particular, a beautiful series of them sent to M. Colladon by M. Ruiz; but the trees which produce them are not yet known, and it is probable that the greater part are obtained from the preceding species, collected at different ages, and in different localities; it is for travellers to clear up these doubts. The majority, besides, appear to Ruiz to be very inferior to the preceding.

Let us observe that quinine and cinchonine are, even at the present time, two products which have been obtained only from the barks of the genus Cinchona. The great success of the quinine, and its identity in the different species of cinchonas which are known, tend to diminish the importance of an exact distinction of the species. During the time that the bark alone was given, it was very essential to know which bark should have the preference; but at present the most important thing to understand perhaps is, which bark will produce the greatest quantity of quinine, at what age it yields the most, and whether the wood and leaves might not furnish it as well as the bark; it is desirable that some pharmaceutical chemist should establish in America a manufactory of quinine, in order to supply at a cheap rate the whole world with this valuable drug, and to prevent, perhaps, the extinction of the cinchonas, by employing all those parts capable of furnishing this product. There is reason to be apprehensive for the fate of this precious vegetable, when we consider that it is no where cultivated, and that, besides the use which is made of it in America, there are sent out annually twelve to fourteen thousand quintals of bark. But if the distinction of the species has lost its importance, that of the genera has, on the contrary, increased, since it has been supposed that foreign barks of the true genus cinchona have no quinine; a fact, the truth of which ought, however, to be carefully ascertained, particularly with respect to the following genera.

II. *Buena.*

This genus differs from the true Cinchona, 1, that the calyx falls after the flowering, instead of remaining at the summit of the fruit; 2, the tube of the corolla is wide and often a little curved; 3, the capsule opens from above downwards, and not from below upwards; 4, and chiefly, that at maturity the tube of the calyx separates naturally from the fruit to which it adhered. The authors of the "Flore du Pérou" designated this genus (dedicated to Cosme Bueno, a Spanish physician) by the name of *Cosmebuena*, because at that time there existed another genus called Buena; but this having been suppressed, it became convenient, after the example of M. Pohl, to give it the name of Buena, in order to avoid a term composed of the first and last names of him to whom it is dedicated, a sort of composition of words which is inadmissible. We are acquainted with only three species of buena, two from Peru (*B. acuminata* and *B. obtusifolia*), whose barks, although febrifuge, do not form a part of those sent to Europe, and one from Brazil (*B. hexandra*), for our botanical knowledge of which we are indebted to M. Pohl, and a chemical analysis of which has been published in the "Mémoires de l' Académie de Lisbon," (Vol. III. p. 2. p. 96). Its bark is used in Brazil under the name of *China*.

[To be continued.]

Review.

Traité des Moyens de reconnaitre les Falsifications des Drogues Simples et Composées, et d'en constater le Degré de Pureté. Par A. Bussy et A. F. Boutron-Charlard. Paris, 1829. *Pp*. 506, 8*vo*.

[Continued from page 158.]

Antimony.—The sulphuret of antimony of commerce is always mixed with variable proportions of arsenic, sulphurets of lead and iron, silex, sulphate of baryta, and earthy matters. It is easily freed by fusion from all these foreign substances, except lead, arsenic, and iron, which remain combined with the metallic antimony, prepared from impure sulphuret by the ordinary process. These substances accompany the antimony in various preparations, and it is important to ascertain the purity of the metal. Arsenic may be detected by calcining the metal in a strong heat with tartar. The potassium of the latter forms, with the antimony, an alloy which decomposes water with the disengagement of hydrogen gas. If there be the slightest trace of arsenic, it combines with the hydrogen, and will be detected by the peculiar smell of arseniuretted hydrogen. It may also be reduced to the metallic state by burning the gas in a long tube.

Lead may be detected by treating the metal with a large portion of hot nitric acid, which dissolves the lead, and leaves the antimony in the form of an insoluble white powder.

Evaporate the nitrate to dryness, redissolve in distilled water, and add sulphuric acid till there is no further precipitate; wash and dry the sulphate of lead, 1895.65 grains of which are equivalent to 1294.49 of metal.

The presence of iron may be ascertained by reducing the metal to fine powder, and treating it with nitro-hydrochloric acid, which dissolves the whole. Dilute with water to precipitate the antimony, the last portions of which may be separated by a stream of sulphuretted hydrogen. The iron may then be precipitated by potassa or other reagents.

Borax.—Borax is now manufactured largely in France by the combination of soda with the boracic acid, which exists uncombined in several of the hot springs of Tuscany, in the proportion of nine grains to the pint. The native borax of Tibet contains a portion of organic fatty matter; it melts into a brown glass, and yields a boracic acid in large brilliant scales. The manufacturers of artificial borax communicate to it all the properties of the native by combining with it a portion of fatty matter.

Borax often contains pieces of alum which may be detected by the taste.

Catechu.—This extract is obtained by boiling the legumes and wood of the acacia catechu.

A sophisticated catechu has latterly been seen in the French market. It is divided into small uniform cubical pieces, larger than those of litmus, having the external colour of catechu, but of a dull, brown and granular fracture. This catechu contains a great proportion of fecula, which may be detected by reducing it to powder and treating with successive portions of cold water and alcohol. Nearly all the catechu will be dissolved, and the fecula alone remain.

Carbonate of Lead.—To examine the purity of white lead, dissolve 100 grains in weak nitric acid, and evaporate to dryness. Then add a sufficient quantity of distilled water to dissolve all the nitrates that have been formed, and wash and filter the residue. Dry this and weigh it carefully, and we shall have the weight of the two substances most commonly mixed with white lead, viz. sulphate of lead and sulphate of baryta. To separate these, boil them in a great excess of hydrochloric acid, decant the clear liquid, and repeat the operation twice or thrice with fresh acid. The sulphate of lead will be dissolved, and the insoluble part is the sulphate of baryta, the weight of which can be ascertained. To ascertain the quantity of carbonate of lead, pass a stream of hydrosulphuric acid gas through the nitric solution till it is in excess. Wash and dry the precipitate, 1495 grs of which are equivalent to 1294 grs of lead and 1670 grs of carbonate of lead. To determine the quantity of carbonate of lime, free the last remaining liquid from hydrosulphuric acid by a little heat, and add carbonate of ammonia, which will precipitate the carbonate of lime.

Castor.—There are regular establishments for the adulteration and imitation of drugs at Marseilles, and castor is manufactured by these ingenious sophisticators. The false castor is in larger and rounder bags than the true, but little wrinkled, and when opened, not exhibiting the traces of membranaceous partitions. The false castor is sometimes soft and sometimes brittle, of a semitransparent red colour, having a faint smell of castor, and forming a lighter coloured powder. It is almost entirely soluble in alcohol and ether.

Chlorate of Potash.—This salt is liable to be mixed with chloruret of potassium, and may be purified by dissolving in boiling water. The chlorate crystallizes upon cooling, and leaves the chloruret in solution.

Chromate of Lead.—This pigment has been adulterated with the carbonates of lead and lime. These impurities may be readily detected by their effervescence with acids. The most prevalent adulteration is the sulphate of lime, which imparts a lightness and a velvety lustre to the chromate that are looked upon as proofs of good quality.

Whether this sulphate has been mixed at the moment of precipitation, or subsequently added by the vender, it is difficult to detect it at first sight. It may, however, be known by the white specks irregularly diffused through the mass. It is best always to test its presence; for this purpose calcine four parts of chrome with one part of finely powdered charcoal in a covered crucible. Treat the residue with weak hydrochloric acid, which decomposes the sulphuret of lime formed by the calcination, and disengages sulphuretted hydrogen gas. Filter the liquid and add a sufficient quantity of water of ammonia to precipitate all the bases but lime; filter again, and add oxalate of ammonia, which will throw down the lime in the shape of an oxalate. The chrome has sometimes been adulterated with starch, which may be detected without difficulty by calcination.

Chromate of Potassa.—This salt is capable of combining with other neutral salts, especially with the sulphate of potash, and forming triple salts with them. The rich colour of the chromate pervades the compound, and renders it difficult of detection by the eye. In a specimen analysed at Paris there was found 56 per cent of sulphate of potassa.

To detect this falsification pour a solution of this salt into a solution of nitrate of baryta until there is no further action; chromate and sulphate of baryta will be formed and precipitated. The chromate readily dissolves in nitric acid, by which means it can be separated from the sulphate, and the quantity of the latter ascertained.

Wax.—Wax is frequently adulterated with potato starch. To detect it dissolve the wax in oil of turpentine, and weigh the insoluble residue.

Copaiva.—This resin is often adulterated with castor oil. To ascertain its purity, mix in a stoppered bottle one part of water of ammonia at 22° with three parts of copaiva, and agitate the mixture. If the resin is pure the mixture becomes transparent in a few minutes, but if mixed with oil it remains opaque. This experiment should be performed at a temperature below 60°, and will readily show the presence of five per cent of oil.

Bark of the Pomegranate Root (*punica granatum*).—The use of this bark, which was noticed by Pliny and Dioscorides, has lately been revived as an anthelmintic. This bark is of an ash gray colour on the surface, yellowish in the interior, and of a slightly acrid and astringent taste, without decided bitterness. Its fracture is smooth, and it colours the saliva of a brownish yellow. In commerce it is sometimes mixed with the bark of the barberry bush (*berberis vulgaris*), which bears a strong resemblance to it in appearance. The taste of the barberry bark is, however, bitter without acridity or astringence; its fracture is fibrous, and it divides, when chewed, into woody filaments; it colours the saliva of a clear yellow; its external colour is gray, its internal a strong yellow.

The salts of iron have no action on an infusion of the barberry, but give to the infusion of the pomegranate bark an intense violet black colour.

Canella Alba.—*Winter's Bark.*—These barks so closely resemble each other, that the former is universally substituted for the latter. It is more easily obtained, and is more fragrant and agreeable. The colour of the former is a pale orange yellow, of the latter a reddish gray. The fracture of the one is smooth, gray towards the surface, and red internally; that of the other granular, marbled with red and gray, and presenting several shades of colour. The infusion of the canella is of a straw yellow, and unaltered by nitrate of baryta and deuto-sulphate of iron; while that of Winter's bark is of a reddish brown colour, and nitrate of baryta and deuto sulphate of iron occasion precipitates in it, the latter of a black colour.

Sulphuric Ether.—An essential condition for obtaining ether of a fine quality, is to prepare it from rectified spirits of wine. That which is made from alcohol of grain or fecula has not so sweet and agreeable an odour as the other, and betrays, when evaporated on the hand, the peculiar and offensive odour which may be distinguished in all the preparations from those alcohols.

Guaiacum Wood.—This wood, which is generally sold in the form of raspings, is frequently mixed with box and other hard woods used in the turners' shops. The true wood may be known by its tincture becoming milky when mixed with water, and of a beautiful blue colour when a few drops are mixed with mucilage of gum arabic. The greater part of the rasped guaiacum sold in America is the wood of the lignum vitæ tree (*guaiacum sanctum*), from which, as well as other species of the same genus, guaiacum is obtained.

Gum Tragacanth, powdered.—This powder is often adulterated with powdered gum arabic. In certain proportions the mixture makes a thinner mucilage than the gum tragacanth contained in it would form. The adulteration may be detected by adding tincture of guaiacum in the proportion of five or six drops to two drachms of the mucilage, shaking it continually. If it contain gum arabic it will assume a fine blue colour in a few minutes. By this means five per cent of gum arabic can be detected, although when the proportion is small the change of colour does not take place for two or three hours. Rectified alcohol poured into a filtered solution of gum tragacanth separates light floculæ without disturbing the transparency of the liquid. When mixed with a solution of gum arabic, alcohol renders it opolescent, and if the solution be strong, occasions a precipitate.

Gum Senegal is always mixed in the original packages with a small quantity of bdellium, which may be readily known by its dull, waxy fracture, and its acrid and bitter taste.

Gum Arabic, powdered.—This powder is sometimes mixed with starch and flour. To ascertain its purity drop a little of the powder into cold water and agitate it for a few moments; the gum quickly dissolves and the starch and flour remain at the bottom.

Miscellany.

Salicine or active principle of Willow Bark.—We noticed, in the number of our Journal for April 1830, the discovery of a principle in willow bark by M. Leroux, supposed by him to be alkaline. MM. Gay Lussac and Magendie were appointed by the Royal Academy of Sciences to examine the nature of this product. They satisfied both themselves and the discoverer that so far from being alkaline, salicine is decomposed by acids, and the latter destroy its property of crystallization. It is evident, therefore, that sulphate of salicine could not exist. Salicine is destitute of azote: when pure it is in white crystals, very delicate, and of a pearly aspect, and very soluble in water and alcohol, but not in ether. Its taste is intensely bitter, and its aroma resembles that of the willow bark.

Process. To procure the salicine, boil three pints of the willow bark (salix helix), dried and reduced to powder, in fifteen pounds of water, charged with four ounces of carbonate of potash. Filter and add to it, cold, two pounds of liquid subacetate of lead. Filter again, treat it with sulphuric acid, and pass through it a current of sulphuretted hydrogen, to separate all the lead. Saturate the excess of acid by carbonate of lime, filter again, concentrate the liquor, and neutralize it by the addition of dilute sulphuric acid. Decolourize it by animal charcoal, filter while boiling, crystallize twice, and dry it, protected from the light. This operation, which M. Leroux will simplify in all probability, furnished about one ounce of salicine from three pounds of bark. This remedy has been employed as a substitute for sulph. quinia in the cure of intermittent fever, and has been found to answer exceedingly well. MM. Magendie, Miquel, Husson, Bally, &c. have exhibited it, and all agree that from twenty-four to thirty grains are sufficient to arrest the paroxysm of intermittent fever completely—which proves it to be nearly if not quite equal to the sulphate of quinia.—*Journal de Chimie Medicale, &c. for June* 1830.

Sarsaparilla.—At the sitting of the Society of Pharmacy of Paris, June 9, M. Thubeuf stated that the best sarsaparilla is that which furnishes the most extract when properly treated with alcohol and water. He presented to the society a principle that he regarded as the aromatic principle of sarsaparilla. It resides in the greasy matter which is a constituent of this root.

Notice of Piperin; *by* T. G. CLEMSON, Member of the Royal School of Mines.

TO PROFESSOR SILLIMAN.

Paris, Jan. 12th, 1830.

SIR: Whilst occupied in Mr Robiquet's laboratory, I had occasion to prepare, for the demands of commerce, more than usually large quantities of piperin:—I have frequently treated an hundred pounds of piper nigrum at a single digestion.—Thus I had an opportunity of examining the substance, and rectifying certain representations respecting its properties, and I think that the following additions cannot but be of utility to those persons who may have occasion to prepare the substance.

After the analysis given by Mr Peletier, piper nigrum contains a crystallizable substance (piperin), an acrid concrete oil, a volatile balsamic oil, a gummy colored matter, an extractive principle, malic and tartaric acids, amidon, bassorine, lignin, and incidental salts.

By following the methods of preparation heretofore given, I have never succeeded without great pains in separating that acrid resino-oleaginous compound so extremely embarrassing in the course of the purification.

It is evident from inspection that the greater part of the coloring matter exists in the outer pellicle of the grain; all attempts to make the separation by mechanical or other means proved fruitless, and recourse to pulverization was found necessary.

The pepper should be ground, and digested in alcohol at 37° or 40° (Baumé) at a smart distilling heat, an alembic with its water-bath is at once convenient and economical; the whole should be agitated from time to time, and the fluid changed if necessary. I know of no better indication of the entire extraction of the piperin, than the want of taste in the mark, or insoluble residue; although acridity (as has been represented) is by no means a property of piperin. The alcoholic solutions being united, should be reduced over a water-bath. The distillation ended, there will be found in the bottom of the alembic, a deposit composed of a great deal of piperin, and a black acrid resino-oleaginous substance; the separation of this latter compound from the piperin is difficult in the extreme, so much so that I have seldom or never seen the preparation free from acridity, which not only destroys, but produces a contrary effect to that desired when employed as a remedy. The greater part of this viscous oil may be separated by cold alcohol, piperin being much less soluble in this menstruum when cold than when warm, and much less than the oil. The latter portion may be entirely separated by the addition of a little lime to the warm solution of piperin with the oil, and leaving it to crystallize in the same vase, which when cold may be separated at leisure, redissolving the crystals thus procured with addition of a little animal charcoal, and filtering when hot, which upon cooling will afford crystals of a canary white, regular and free from acridity.

Mr Pontel has advised the use of caustic potash, and the effect is certainly very marked. The solution should be weak, for caustic potash has a tendency to alter the nature of the substance, and instead of procuring piperin, I once found a compound that resembled very much that of soap, and all subsequent attempts to procure the substance in crystals failed; moreover I have always observed, that those crystals obtained by the aid of potassa had more or less of a reddish tinge, and were very brittle.

Piperin, when pure, crystallizes in right square prisms, occasionally presenting an anomaly, the crystals, particularly those obtained through the means of potassa, being hollow, or containing an interior decrement, the four vertical sides being entire, and showing the form of the crystal. Insoluble in water, soluble in cold alcohol, and more so when warm, insoluble in acetic or other acids. It has been employed latterly in Italy as a febrifuge.

If you think the above worthy of being made public, will you have the goodness to give it a place in the next number of your excellent Journal of Science and Arts.—*American Journal of Science and Arts for July* 1830.

Formula.—In foreign pharmacopœiæ and other works of pharmacy we often find formula for combinations, that are entirely unknown to those of our own country. We insert the following from Verey's Pharmacy without any respect to arrangement.

Silk Plaister Cloth.

	R.—Isinglass	1 oz. 1 dr.
a	Alcohol 22° Baumé	12 oz.
	Tincture of Benzoin or of Balsam of Peru	2 oz.
b	Tincture of Benzoin	6 oz.
	Fine liquid Turpentine	4 oz.

This kind of plaister is applied on white or black silk, stretched on a frame garnished with points. A solution of the isinglass is to be made in boiling water: to this is to be added the alcohol and tincture of benzoin (*a*) mixed together hot and well filtered. Of this solution a thick coat is to be applied to the upper surface of the silk, by means of a brush or pencil. This coat being dried, five others are to be successively applied; afterwards two coats of the tincture of benzoin (*b*) and the turpentine. This last application increases its flexibility; and though some pharmacians prefer the tinct. bals. Peru, yet the latter scales off more readily, while it is more agreeable.

Dover's Powders—The following formula for this ancient and celebrated powder is from the French Codex.

R.—Sulphate of Potassa	each 4 grammes, or $61\frac{76}{100}$ troy grains.
Nitrate of Potassa	
Ipecacuanha in powder	each 1 gramme, or $15\frac{44}{100}$ troy grains.
Opium purified	
Liquorice in powder	

It is recommended in the pharmacopœia of Swediaur to melt the nitrate and sulphate of potash together in a crucible, and then unite them to the other powders. The dose is directed to be 12 grains.

Cough Lozenges of Tronchin.

R.—Powdered Gum Arabic	8 oz.
Brown Hydrosulphuretted Oxide of Antimony	each 4 scruples.
Anise	
Extract of Liquorice	2 oz.
Gummy extract of Opium	12 grs.
White Sugar	2 lbs.

Mix and make into lozenges weighing 6 grains each. Of these one may be taken occasionally in diseases of the throat and chest.

Lozenges of Oxalic Acid for thirst.

R.—Pure powdered Oxalic Acid	2 dr.
Sugar	1 lb.
Volatile Oil of Lemons	20 or 30 drops.
Mucilage of Gum Tragacanth	q. s.

These lozenges may be coloured red by means of a little carmine, blue by Prussain blue, or yellow by turmeric if desirable. They are very pleasant in fever. And if it be desirable merely to make an *oleo saccharum*, the mucilage need not be added, and the compounds can be preserved in the state of powder and used to prepare *lemonade.*

Lozenges of Magnesia.

R.—Calcined Magnesia	1 oz.
Powdered Sugar	4 oz.
Mucilage of Gum Tragacanth in orange flower water	q. s.

These lozenges are prepared as the preceding.—In the same manner may be formed lozenges of chalk, prepared oyster shells, &c.

Paste of Liquorice, Gum, &c.

R.—Purified Extract of Liquorice	1 lb.
Gum Arabic	2 lbs.
White Sugar	1 lb.
Powdered Orris Root	1 dr.
Oil of Anise or other Volatile Oil	24 drops.

Dissolve the gum in warm water, (q. s.) strain it, and add to the solution the sugar and the liquorice, and liquefy the whole on a sand bath. Then evaporate it to the consistence of a thick syrup, and mix the powder and essential oil with it. The paste is afterwards to be placed in metallic moulds, such as is used for chocolate, and exposed to a temperature of 40° or 50° of C. in a stove, until it is sufficiently dried. It is then divided into little squares, and esteemed expectorant and demulcent.

Jujube Paste.

R.—Jujubes, peeled and selected	1 lb.
Sugar	5 lbs.
Gum Arabic	6 lbs.
Water	30 lbs.

The jujubes are to be pressed in order to open them, then boiled in the water, and afterwards passed through a cloth by expression. With this decoction and the sugar, a concentrated syrup is to be made, which it is best to clarify with the whites of half a dozen of eggs, and strain it when reduced to two-thirds. The gum arabic, clean and bruised, is to be dissolved in part of the water, strained, and thickened by evaporation, and then added to the syrup: the whole to be rendered aromatic with the alcoholic tincture of citrons dissolved in a little water. The syrup afterwards to be poured into moulds, and evaporated to the proper consistence in a stove at a heat of 30° C. The mass obtained should be 9 lbs. If dried too much it becomes as tenacious as horn.

Dœbereiner's Glass of Strontia.—We are indebted to the kindness of our friend Dr Lewis Feuchtwanger for some translations from German Journals.

To prepare the above compound—

Take—Sub-Carbonate of Potassa	70 parts,
Sub-Carbonate of Soda	54 parts,
Carbonate of Strontia	74 parts.

These salts melted together furnish a mass of a milky whiteness, which, combined with 224 parts of silex, afford a most beautiful glass, distinguishable from the crown glass by its greater fusibility and specific gravity, and being more refractive than the latter.

Dœbereiner's Soluble Glass—Take of

Sub-Carbonate of Potassa	70 parts,
Sub-Carbonate of Soda	54 parts,
Silex	192 parts,

Melt these articles together, and the result will be a beautiful glass of great hardness, soluble in boiling water. When cold this solution is thinner, and less apt to coagulate than that obtained by the formula of Mr Fuch, the discoverer. It may be readily prepared in a platinum crucible over the flame of an Argand's lamp. This compound can be applied to a variety of purposes. It easily penetrates the pores of wood, and renders it incombustible, and may therefore be employed (as it is cheap) to render buildings fire proof. It forms a fine, transparent and elastic varnish, which has no action on ink and may serve beneficially to cover prints, maps, &c.—*Erdman's Journal.*

Sheele's Green.—This substance is a combination of deutoxide of copper and of oxide of arsenic; it is pulverulent and insoluble in water. When exposed to heat, it emits a very strong smell of arsenic; heated in a tube with charcoal, it yields metallic arsenic and copper mixed with charcoal. The Sheele's green is obtained by the following process: boil for half an hour in a sufficient quantity of water eleven parts of white oxide of arsenic with thirty-two parts of subcarbonate of potassa: let the liquor settle, then mix it with a solution of thirty-two parts of sulphate of copper in five hundred and forty-four parts of water. Stir the mixture well, and the Sheele's green precipitates. Drain the precipitate upon a piece of linen and wash it several times in order to separate the sulphate of potassa.

Mr Braconnot has given us the following process for obtaining green as fine as that of Schweinfurt. Dissolve eight parts of oxide of arsenic and eight parts of pearlash, decompose this solution with six parts of sulphate of copper, and mix the precipitate with three parts of acetic acid.

This green is used in the fabrication of hanging paper and oil painting.—*Dict. des Drogues.*

Method of drying Narcotic Plants for Powders.—Mr Battley has prepared the following rules for drying narcotic plants for powders: The same rules for reviving withered plants must be practised as recommended in the April number of our Journal, page 86. Then the leaves being in a state of high preservation, and entirely freed from the stalks and external moisture, must be laid in thin layers, in baskets made of peeled willow, placed in a drying room, from which the light is entirely excluded. The temperature of this room should be raised to between 130° and 140° F. for three or four hours, or until the leaves begin to shrivel. They are then to be turned, and the same temperature preserved for six or eight hours longer, which will generally complete the process. This fact may be known by the leaves crumbling easily in the hand. When the process has been properly managed throughout, the leaves will be found to retain their green colour in perfection, and consequently their medicinal properties. Oil jars made perfectly clean and dry are found to answer best for preserving them in this desirable condition. The leaves should be placed lightly in the jars; they should then be hermetically sealed, and kept in a dry and warm situation.

The rules suggested by Mr Battley appear to us well worthy of the attention of our apothecaries. Narcotics are an important class of remedies; and as they are so modified by soil, climate, cultivation, &c. it should be an object with our apothecaries not to allow them at any rate to deteriorate in the manipulations to which they subject them.—*Ed.*

La Société de Pharmacie de Paris.—At a sitting of the Society on the 15th October 1829, the secretary introduced as part of the printed correspondence, that M. Elias Durand, formerly pharmacien major to the French armies, now resident at Philadelphia, had addressed, in the name of the College of Pharmacy of that city, several copies of the first two numbers of the Journal which that College is engaged in publishing; and expressed the desire to see the Society of Pharmacy of Paris enter into friendly relations with the College of Philadelphia. This proposition met with a warm reception, and M. the secretary general was charged to give immediate attention to it. M. Chereau was requested to present a view of the principal memoirs contained in the Journals.—*Journal de Pharmacie, Nov.* 1829.

New source of Spirit.—It is stated that the berries of the Sorbus Ancuparia are now used in the north of France for the production of spirit, and the result is said to be equal to the purest distillation from grapes for brandy. The perfectly ripe berries are exposed to the cold, then bruised in a wooden vessel, boiling water added, and the whole stirred until the temperature falls to 82° F. A proper quantity of yest is then added, the materials covered and allowed to ferment. After the fermentation ceases the liquor is drawn over by distillation in the ordinary manner. The first product is weak, and disagreeable in flavour, but, by being distilled a second time, with the addition of eight or nine pounds of finely powdered charcoal to forty gallons of weak spirit, a very superior article is produced. The charcoal should remain in the liquid two or three days before the second distillation.—*Lond. Med. and Surg. Journ. Feb.* 1830.

Estimation of the Vegeto-Alkali in Peruvian Bark.—It is often important in pharmacy to be able to tell the value of a sample of bark, by ascertaining the quantity of quinia or cinchonia which it contains. MM. Henry and Plisson, and also M. Tilley, have published processes for this purpose. Professor Gobel applies the following method to obtain the same end:—Two ounces of powdered bark are acted upon, at successive times, by sixteen ounces of water and one hundred and eighty grains of muriatic acid, specific gravity 1.13, ebullition being occasioned; all the liquids are to be put together, and caustic potassa added, which produces a brown precipitate: this is to be redissolved in dilute muriatic acid, again precipitated, and so on, until the precipitate is quite white; it is then to be dried, and treated with cold strong alcohol, to separate the quinia and cinchona from each other.

M. Veltman has devised the following process, which may be applied to small quantities, is easy of execution, and exact:—Fifty-five grains of the bark in fine powder is to be mixed with an equal quantity of washed siliceous sand, the grains of which are about half the size of poppy seed: this is to be well mixed with five drops of muriatic acid, and twenty drops of alcohol, and pressed lightly into a glass tube four inches and three quarters long, and 0.6 of an inch in diameter, one end of which has been covered with a little piece of muslin, and then inserted into a close vessel. The other end of this tube is to be connected by a bent tube with a small flask filled with a mixture of an ounce and a half of alcohol and twenty drops of muriatic acid; the bent tube should be 0.2 of an inch in diameter; one end should go to the bottom of the flask, the other should reach the surface of the mixed bark and sand. The alcohol in the flask is then to be boiled by a small spirit lamp. It will pass through the tube and extract all that is soluble. If the ebullition is performed slowly, the last drops of alcohol pass nearly colourless. The reddish brown alcoholic tincture is to be precipitated by hydrated lime; after twelve hours it is to be separated by a filter, the liquor is to be rendered slightly acid, evaporated until in a soft state, then dissolved in a hundred and twenty grains of water, and precipitated by a few drops of caustic ammonia. The precipitate being dried, indicates the quantity of alkali in the bark. In this way M. Veltman found that from 3.3 to 6.0 parts of vegeto-alkali were combined in 100 parts of different varieties of bark.—*Bull. Univ.*

Taste of Sulphate of Quinia.—The bitter taste of sulphate of quinia is so strong, that the mixture of one part with one hundred and sixty of sugar still has it sensibly. It is, however, remarkable, that if one part of the same salt be mixed with ten or fifteen parts of the powder of valerian, fennel, anis, orange peel, &c. a mixture is obtained which has scarcely any bitterness. Sugar, therefore, is a bad thing to remove the bitterness of sulphate of quinia: the end may be better obtained by the use of some aromatic powder.—*Mag. fur Pharmacie.*

Phosphate of Quinia.—The phosphate of quinia, rendered slightly acid, is, according to M. Harless, a much milder medicine than the sulphate or the free alkali.

It is better retained on the stomach where irritation exists, or by nervous patients, or by those who are subject either to congestions of blood or inflammation; its use does not occasion that unpleasant feeling which is sometimes produced after taking the sulphate: it does not so readily accelerate the motions of the heart, nor does it irritate the bronchiæ or lungs. In consequence of its insolubility and pulverulent state, it is administered in pills, from one to four grains being a dose.—*Bull. Univ.* C. xx. 240.

On the Development and Growth of Cantharides.—Zier. The flies always deposited their eggs on the smooth sides of the vessel in which they were inclosed; it was found requisite that these sides should not be transparent; so that when the glass capsules were used they were covered with black paper, and there the eggs were deposited. Each female produced from one to two hundred in a small heap. Nothing is more difficult than to observe the transformation of these eggs into larvæ, in consequence of the momentary nature of the change. M. Zier, knowing about what time to expect the change with certain eggs, waited for and watched them under the microscope, and was fortunate in catching the moment. He first remarked certain slight motions, followed by others much stronger and quicker, at one end of the egg, and instantly it was converted into a living being, a small larva. It was impossible to discover any envelope which might be supposed to be left by the insect; the whole egg appeared to be vivified.

The larva is at first colourless, and formed of thirteen rings, of which the first is the head, the three next have each a pair of feet, by which the insect moves with considerable rapidity, the nine other rings form the body. Two black points on the first rings are the eyes, above is a sort of black antennæ, the last ring has two hairs. Almost immediately after the change, the posterior part of the larva acquires a dark tint, which advances gradually to the fifth ring, the fourth and third remain pale, but the second and first become black.

These small animals move very quickly, and soon leave the place where they were deposited as eggs. When they feel any movement in the neighbourhood, they roll themselves up so as to look like black points. The metamorphosis of all the eggs into larvæ, and the disappearance of the insects, does not require more than a quarter of an hour. The young larvæ reach the earth and then penetrate downwards.—*Bull. Univ.* B. xx. 181.

Effect of Light on Plants.—M. Leuchs. It is well known that solar light, by enabling plants to decompose and assimilate carbonic acid, gives them the power of forming volatile and aromatic principles, and of acquiring a green colour. Its presence is so necessary to flowering and fructification, that ripe seeds have never been obtained in darkness; on the contrary, if an etiolated plant be exposed for three, four, or five hours to the sun, it immediately becomes of an equally intense green colour with those which have continually grown in light. Plants raised in the open air, when put into darkness, become pale and fade in two or three days; those which, after being raised in darkness, have been exposed for a time to sunlight, cannot again support the privation of light, but die; and water charged with champher, or essential oil, which has great power of invigorating plants, cannot prevent their destruction. The perfect absence of light is therefore very injurious to plants, and M. Leuchs concludes, that, without the light of the moon and stars, nights would destroy vegetables.

The light of a lamp can, although imperfectly, replace that of the sun; the plant becomes green and tends to the light. When seeds were germinated in three vessels, the first uncovered, the second covered with single, and the third with double paper, those of the first vessel exhibited less external development, but when dried, they gave more solid matter; those in the second were more developed, but were more aqueous and loose; the difference was still greater in the third vessel.

The texture of various plants appears to be more or less aqueous (if the word may be used), when deprived of light, according to the nature of the plants. When plants were placed in a damp cellar or cave, enlightened by a flame, those nearest the flame contained most solid matter; the results were so regular, as to present something like a law, relative to the action of various quantities of light on vegetables.

Light reflected by mirrors appeared to have a very beneficial influence upon plants, and M. Leuchs thinks that many hill sides are rendered fertile by the similar reverberation of light from the neighbouring rocks.—*Archiv von Kastner*, xv.

JOURNAL

OF

The Philadelphia College of Pharmacy.

NEW SERIES.

VOL. II.—JANUARY 1831.—NO. IV.

Original Communications.

Address delivered to the Graduates, by Henry Troth, Esq. one of the Vice Presidents of the Philadelphia College of Pharmacy, at the Annual Commencement of the College, October 1830.

[Published by direction of the College.]

Gentlemen:

Graduates in the College:

IN conformity with the established usage of the Philadelphia College of Pharmacy, you are assembled this evening to receive from my hands, as its organ, the reward which it has allotted to you for your studies, and your pursuit of the objects which it was instituted to promote. After a regular apprenticeship, and attendance on the lectures in the school of pharmacy, you have become candidates for graduation; you have been examined by the professors and a committee of the trustees, who have reported their satisfaction with your proficiency, and the college has awarded to you its diploma, and declared you to be its graduates. The duty has devolved upon me to address you on this interesting occasion. I do not presume to suppose that I can set before your view subjects entirely new to your minds, or thoughts upon which your own reflections have not been exercised. If, however, in course of the few desultory remarks I am about to make, I can succeed in drawing your attention to matters, not new, but intimately connected with the honourable pursuit of the business of your adoption and your success in life, I shall deem myself happy in the belief, that your cultivated minds cannot entertain such subjects without being benefited by the contemplation of them. You have selected for your pursuit a business of no ordinary cast, and possessing peculiar claims to consideration and respect. It is one of difficult acquirement and tender reputation, easily tarnished by incapacity, presumptuous ignorance, indolent habits, or want of strict integrity. From its varied character it calls for diversity of accomplishments and qualifications in the candidates for its knowledge, its wealth and its honours; in which class I trust you may properly be placed. These qualifications and accomplishments, together with some of the evils and abuses mingled with our present customs, it is my intention briefly and incidentally to set before you; and however I may fail to pourtray them in their most appropriate colours, I trust my efforts will not be entirely unavailing; for poor indeed must be the mind of him who has treasured up no valuable experience, and learned no lesson of wisdom during a period of twenty years of observant attention to the avocation which he has pursued, and to the general aspect of affairs and customs around him. Let me rather impress upon your minds, that though on all occasions we should distrust our abilities and attainments, yet each year of our prospective lives should be viewed as a mine of hidden treasures, of knowledge, of experience, of wisdom. That it is our important duty and privilege to labour in these mines for the development of their riches, and that our increase of wealth in these jewels of life should be steady, progressive, and certain, to our own adornment and usefulness in society.

We will now suppose, young gentlemen, that during your apprenticeships you have been models of industry; of active habits of mind and of body; of cheerful obedience in the discharge of your daily duties; that you have eschewed the self-important pride which so commonly haunts apprentices, and would fain persuade them that they demean themselves by doing the drudgery of their stations, and that they are degraded by the discharge of their plainest duties. Let us suppose that your pharmaceutical studies have been ardent and unwearied; that you have been attentive inquirers into the nature and qualities of each article of the materia medica; that you have been sedulously and conscientiously careful of the lives of all who obtained medicines from your hands, and that no important mistake has ever resulted from your inattention, your carelessness, or ignorance of the nature of medicines. In fine, let us suppose that the whole course of your apprenticeships has been characterized by strict integrity, by habits of industry, cleanliness, and love of order, and by a cheerful and polite behaviour to all; and superadding the diploma which you are now about to receive, the testimony and seal of the Philadelphia College of Pharmacy to the sufficiency of your knowledge and qualifications to conduct the business of your adoption; admitting all these preliminaries to character and success in life, your claims to consideration and respect would assuredly be of no ordinary cast. And yet, predicated upon such merits as these, should imaginations of your own attainments and pre-eminence haunt your minds, let me entreat you to banish them far from you. You have but just entered upon the threshold of knowledge and of character, and have yet much to learn. Arrived at an important and interesting era of your lives, it becomes you to pause and reflect.

"A soul without reflection, like a pile
Without inhabitant, to ruin runs."

You may quickly discern the great and powerful influence of custom and fashion pervading the inmost recesses of society, and moulding the habits, and manners, and thoughts, and actions of those who surround you: their virtue, morals and business habits, and the movements of trade, all bend to the influence of these mighty magicians, who model the youthful character to conformity with the existing order of things around them. Are you prepared to go with the current of fashion and custom whithersoever it may set? Your answer can easily be anticipated. And yet few are aware, to the full extent, of the magical influence of these potent delusions. They are syrens whose sweet music lulls our understandings to sleep, and who would fain beguile us into the broad and beaten track, even though destruction awaited us on the way. That we may not blindly follow in the footsteps of others, and that we may in proportion to the advantages we possess, and to our natural and acquired ability, give our full share of impetus to the march of mind, we should be careful to strengthen our understandings and mature our judgments by the opinions of the aged, the experienced, the wise and the good, both the living and the dead. And whilst we read books, and men, and things, let me earnestly recommend a vigorous and manly exercise of your own judgment in the affairs of life. It is not infallible, it may sometimes lead you astray: but admonished by the wisdom and experience of others, and held in just subordination to divine influence, it is the rock of your safety in the storms of life. Whilst no delusive views should tempt us to set up for reformers of society, yet as an integral part of society it is our solemn duty to reform ourselves, and to hold up a good example of sound opinions and correct actions to our fellows. To qualify you for such purposes of usefulness, you should endeavour to form to yourselves rigid and correct standards of merit for your government, as men, as merchants, as pharmaciens; and whilst you carefully avoid a censorious disposition, you should freely and rigidly examine and consider the customs and habits of those around you, whose pursuits resemble your own. Are they in every particular such as your conscientious and deliberate judgment approves? If not, wherein do they differ? And are you well assured that in your estimate of these differences you set a relative value on them, commensurate with their merits, neither too high nor too low. On the one hand you run a risk of becoming eccentric and visionary, and endanger your character for sound and discriminating judgment. On the other, by undervaluing these differences, you are not likely to view them with a critical and discerning eye; the eyes of others will become your medium of vision, and you will travel the road of life with the common mass, who are moved forward by the current of fashion and the impulse of custom.

In forming the standards of merit for your government, from a rigid examination of the existing order of things in which you move, your attention will perhaps first be called to the history, condition, and prospects of the trading community, in which you are about to launch your occupation, and embark upon it your hopes and fears, your fortune and your happiness, your integrity and your honour. In taking a view of the condition of trade, as exhibited to us within the compass of a few past years, we behold much to lament, and much to condemn; a continued series of rapid alternations of prosperity and adversity; the cupidity and folly of our legislators deluging the country with banking institutions; the credit system inflated and morbidly extended to an immeasurable degree; the cheapness of credit tempting thousands to embark in business without sufficient knowledge or qualifications to command success, and inducing wild speculations, a general system of over-trading, and the natural consequences invariably attendant upon such a state of things, embarrassments and insolvencies, the fruitful source of dishonour and degradation, and loss of integrity.

The great uncertainty of trade, and the consequent danger of insolvency, are produced by numerous causes of very different character. Some few of them are misfortunes and calamities, which human prudence and foresight cannot avert; but the greater part result from relying too much upon persons who deceive us, or are themselves deceived—venturing into business, without sufficient capital in character or knowledge of our pursuit—yielding to a morbid desire of getting rapidly rich—embarking in speculations—and mainly, the universal custom of over-trading, arising from the credit system of the country, which has its origin in the excessive banking system that pervades the whole union. It is an old maxim, that the best things, when perverted, become the worst. This will not inaptly apply to the banking system, the beneficial influence of which, within narrow limits, and with wholesome and wise laws to protect the public from its running riot, is not to be questioned. It gives vigour and activity to trade: it furnishes a useful medium of exchange; and when used with great caution, it produces a healthy stimulus to enterprise. These are the effects, when the number of banks is limited. Let these limits be extended, and you put into the hands of the trading community an intoxicating bowl of tempting aspect and delusive efficacy. The desirable requisites for persons about to embark in business, are, capital in character—capital in knowledge—and least of the three, capital in money. The two first will, under any state of things, generally command the last, when they are eminent in quality and degree; but this standard of eminence sinks, and the merits of the trading community are depreciated, in proportion to the extension of the banking system, and the cheapness of credit. These may be extended and increased, until the commercial operations of a country become almost a lottery, and the business even of the skilful and the prudent a game of hazard. In our youthful, vigorous, and productive land, where the means of subsistence are easily obtained, a moderate share of industry and steady habits, knowledge of business, and prudent calculation, ought not only to command sufficient food, clothing, and shelter, but a reasonable supply of the luxuries of life; and insolvencies should be of rare occurrence.

The standard of essential qualifications for embarking in trade should be raised: longer apprenticeships, or subordinate services after their termination, and increased stability of character, are the wholesome remedies which should be taken by thousands, who now dash onward with blind and heedless impetuosity, determined to make up in enterprise and spirit, what they lack in character and knowledge. Grasping at capital and credit wherever they can be found, and reckless of consequences, they embark in foolish enterprises, they undertake wild speculations, they spread out in broad and palmy luxuriance, to the admiration of the crowd, the wonder of their friends, the envy of their acquaintance, and to the evil example of all. Their career is generally short, and their catastrophe often marked by ruin and distress, loss of character, integrity, and self-respect. If these effects were confined to themselves, how deplorable soever they might be, small comparatively would be the evil that society would sustain: but the friends who put forth their breath to blow the bubble that dazzled them in the sunshine; the incautious and the confiding; and many whose only misfortune it was to be transiently fellow passengers by the way, feel the catastrophe, and oftentimes to their ruin. Let it not be said, that these are extreme or rare cases. In greater or less degree, such instances are almost of daily occurrence, and the example of their frequency takes from them the wholesome influence of public reprehension.

To these temptations and evil influences, the druggist and apothecary is exposed in common with other merchants. We will now turn our attention to some of those peculiar to pharmacy. There is perhaps no business or profession pursued in which long and regular apprenticeships, industrious and studious habits, love of order and method, varied knowledge, and unbending integrity are so necessary as in our own. In most other pursuits, the only penalty of ignorance is individual abasement or unsuccessful efforts. In the business of *your* adoption, the case is widely different. The consequences of insufficient knowledge may be fatal and calamitous, involving the health and lives of those around you.

In the composition and preparation of its articles, pharmacy is a trade; and owing to the extreme nicety and great diversity of its preparations, is a trade of difficult acquirement. In the operations of purchasing, importing, and selling, it is a mercantile pursuit; requiring an intimate and distinctive acquaintance with an immense number of articles—a knowledge of their sensible qualities, their commercial history, and their various officinal preparations—the relative degrees of their liability to be injured by time, exposure to air, light, and the depredation of insects, and other causes acting upon them with almost infinite diversity. From all which, it is evident, that there is nothing within the compass of buying and selling, a perfect knowledge of which is equally difficult of acquisition. But the business of the pharmacien stops not here:—it is a *profession* calling for education, intense study, and extended scientific attainments in chemistry, botany, mineralogy, animal physiology, and the various branches of natural history.

A knowledge of the nature of the human system and its diseases, is of important service to the pharmacien; for though the regular, scientific and enlightened apothecary, and the medical practitioner have distinct professions, they are intimately and importantly connected; and whilst it would be unbecoming in the apothecary to obtrude himself upon the community, or the patient of the physician, as a medical adviser, yet, *as such*, he has his rights and his duties to perform. In emergencies where the skilful physician or surgeon cannot be had, as well as in many unimportant cases, particularly in the lower walks of life, where the sufferers are not accustomed to incur the expense of regular medical aid, he should be capable of giving valuable advice, and rendering available assistance. Humanity and benevolence call upon him to qualify himself for rendering such kind offices, for which he gets neither fee nor pecuniary reward,-unless it be the trifling consideration of the medicine used, which, in such cases, is oftentimes given away. In the discharge of these duties presumptuous ignorance and reprehensible quackery are carefully to be avoided.

It is an essential part of the apothecary's business to be well acquainted with the peculiar *medical* properties of all his medicines. Let him superadd a general knowledge of the human frame, and the nature and characteristics of its common diseases and their simple remedies: let him beware, however, in the exercise of this knowledge, that he does not intrude on the business and province of the physician, by visiting and prescribing for the sick, or obtruding his advice upon the patient of the doctor*. In England apothecaries have duties to perform very different from ours, and are virtually a lower grade of physicians and surgeons; previously qualifying themselves for their station by the requisite studies. They are examined and become graduates, and perform a large share of the attendance on the sick. The English customs are widely different from those of this country, which may be considered as erring in the other extreme, by paying little or no attention to the study of the nature of diseases. There the apothecary is called upon in common cases to go to the houses of the sick to prescribe for them, and to administer his medicines in such quantities and kinds as he thinks proper. Prohibited from charging for his knowledge or his services, he is exposed to the temptation of overcharging his medicines, or giving them to excess, to compensate him for his attendance. Let us avoid the English system,—it has many points and tendencies of which we cannot approve, and it is not the least of its blemishes that it tends to foster an evil of great and widely spreading magnitude—*the excessive use of medicines.* People accustom themselves to take them, and physicians frequently prescribe them to excess, without adequate cause; and the apothecary and the practitioner of medicine often merit reprehension as accessories to this increasing evil.

---

* These are individual opinions of the writer, and in some instances are known to differ from those of other members of the college. He is aware that it is a subject of much nicety, and he would not be understood as recommending to apothecaries to meddle officiously with the healing art; but, as opinions have been promulgated which would seem to call in question the right of the apothecary to acquire or exercise the smallest degree of knowledge of the application of medicines even to the most trifling ailment of the human system, he deemed it his duty to express his dissent from such doctrines. An apothecary cannot have too much knowledge, nor can he be too discreet in the use or exercise of it.

Passing by the matter of deficient apprenticeships and want of adequate knowledge in those who pursue the drug business in our country, one of the next evils in magnitude, and partly consequent upon the first, is the practice of indiscriminately inventing and compounding *infallible* nostrums, and puffing them in the newspapers in terms of the most disgusting and fulsome commendation. The simple and the credulous, the needy and the unprincipled, are subsidized for commendations and certificates, and the suffering world is informed that the great inventor has (apparently with condescension) appointed the principal druggists and apothecaries his special agents, upon whom it may call and get relief. The inventors of these wonderful nostrums, infallible remedies, and glorious panaceas, are generally ignorant pretenders, who know little or nothing of the nature of medicines or diseases. Though among them there are exceptions to this general censure, yet, in the main, they are unworthy of our respect or confidence. This class of people are composed of the most heterogeneous and discordant materials;—a small part are apothecaries, the residue are from all the professions, trades, and occupations in the community: physicians, bookbinders, barbers, day-labourers, sharpers, knaves and fools, help to make up the grand total, who honour the apothecaries and druggists with their special patronage. These, for the paltry consideration of a trifling commission, too often willingly accept of agencies, suffer their names to go abroad in the newspapers and on the directions to the nostrum, mixed with wretched literature, shameless falsehoods, and contemptible gasconading.

In condemning this wide-spread evil, I do not speak in the spirit of the physician who denounces *every* species of quack medicine and all compound remedies for particular diseases, however clearly their merits may be marked, or successful they may be in application. Jealous of their profession, *some* gentlemen cannot approve of any healing compound unless it emanates from the prescription of an M.D. specially called at the time and for the purpose. This general and indiscriminate denunciation is unquestionably wrong. There are valuable medicines of this description, some of them of long standing and general notoriety; others of more recent date, which, however we may doubt some of their assumed merits, we must admit are worthy of sale and patronage. But the number of such is small in comparison to the myriads of insignificant and unworthy compounds which are obtruded with shameless effrontery upon the public, through the drug stores of our most respectable apothecaries, whose names add weight and give currency to the vile imposition. As a general rule, we should reject all agencies for the sale of such articles. If their merits are of superior cast, and their pretensions as set forth in their directions and advertisements, sufficiently decorous and becoming, their character will perhaps assume such respectability as to make it proper for us to keep them for sale, as we do other articles of public demand: but surely our condition and business are of higher merit than to make it necessary for us to degrade it by such a shameless cooperation and copartnership with the vulgar herd of nostrum quacks.

Another of the most prominent evils among the community of druggists is the practice of dealing in and keeping for sale medicines or goods of spurious, sophisticated or inferior qualities. The various manipulations and combinations to which many of the articles sold by the druggist and apothecary are subjected, offer so many facilities for vending inferior medicines, that it is not at all surprising that such strong temptations to cupidity should sometimes prevail over the sound judgment and strict integrity of their vendors. The worst form of this vice, the sophistication and manufacture of spurious medicines, I am fain to believe is rarely practised amongst us. Within the last twenty years a decided change has taken place in this particular: an abundant supply of genuine medicines of all kinds, their extreme lowness of price, and the increased intelligence and respectability of the general community of druggists and apothecaries, has nearly banished this worst of pharmaceutical vices. Such cannot be said of the next grade of this evil.

The morbid desire of making money rapidly impels us to undersell our competitors in trade, and our efforts to monopolize a large share of business by obtaining the character of selling goods cheaper than others, are still powerful in their influence, and lead too many into the evil and reprehensible custom of purchasing and vending inert and inferior medicines.

To remedy these evils and the abuses incident to the business of the druggist and apothecary; to diffuse the knowledge of pharmacy and its collateral branches; to encourage long and regular apprenticeships as essential preludes to the pursuit of this avocation; and to elevate the character of our pharmaciens, by honourable and manly views of the duties incumbent upon them:—to attain such praiseworthy objects by a union of effort amongst the druggists and apothecaries of our city, the Philadelphia College of Pharmacy was instituted. The first of its kind on the American continent, it has encountered peculiar difficulties and discouragements. The scoffs and jeers of its open enemies; the apathy and indifference of its friends; the lukewarmness of its members,—some of whom, well calculated to aid and advance its interests, giving way to petty and unworthy jealousies, have shrunk from usefulness, whilst others, with good intentions, have suffered their zeal for its cause to slumber, and have too often let trifling engagements interfere with attendance on the discharge of their duties as its members. These and other causes have at times retarded its progress—yet its course, though sometimes slow, has been progressively onward. It has already accomplished much, and much remains for it yet to encounter and perform. And who is there to say that it will shrink from the discharge of the duties devolving upon it; or that its movements will ever be retrograde? I, for one, will never believe it. It would be a reflection so degrading to the gentlemen who are its members; to you, its graduates; and to the rising generation of apothecaries, who will seek its schools of instruction as the most efficient means to accomplish them in the knowledge of their profession, that it cannot be indulged for a moment. Nay, it may safely be predicted that, aided by its graduates, to whom it looks for zealous, active and enlightened support, its future progress will greatly exceed, in substantial usefulness, the most sanguine calculations of its friends and founders. It is an institution that must and will flourish and spread its beneficial influences far and wide; diffusing knowledge, and pointing to *integrity* as the governing principle of the pharmacien. None can accuse it of sordid or selfish views; its objects and aims are benevolent and honourable to its members. Let us, therefore, zealously and actively unite for its support, and let us hail each annual commencement as the harvest of our labours.

Finally, gentlemen, let me strongly recommend to you the necessity of industrious habits as the essential foundations of eminence and prosperity. Would you desire to become upright and intelligent merchants, accomplished pharmaciens, respectable and thriving citizens, meriting and obtaining the honours and rewards of the profession which you have espoused: you must banish indolence of mind and of body; you must be active; you must work; you must study. An *indolent* apothecary should be held as an anomaly in creation. There is no pursuit so incompatible with indolence. To industrious and cleanly habits add a love of order and method in your store and in your business. These primary virtues of the mercantile pharmacien should not be the less valued because taken together they are comparatively of rare occurrence. When we look round at many of the drug stores in our cities and villages, the heart often sickens at the sight; dirt and filth, disorder and confusion, decay and waste, with an aggregation of ill smells, too often characterize them. These once tolerated, we accustom ourselves to preside over confusion, and look calmly on disorder within our own control; or we imbibe a distaste for our stores, which become prisons to their inmates, who consider their presence in them as a necessary evil. Though sometimes we see those who mingle their pleasures and their business to the serious detriment of their prosperity, yet the reverse of this is a common failing, and is apt to be of evil tendency. Moderate labour, exercise, and active and industrious habits, are not only the foundations of our prosperity, they are essential to our happiness, and are virtually a part of it: though it is a common delusion of the mind to indulge a belief to the contrary. Thus business becomes an irksome toil, and is pursued as a necessary evil. Instead of this let me urge you to a contrary course. Cultivate a love of your business from its own inherent merits, as a means of present happiness and as a source of honourable dependence and virtuous enjoyment. Become not its slave, nor let it tyrannize over you; but let it be rather as your companion and friend. Watch over its character and guard its honour with sedulous care. It is a plant of slow and tender growth, and must be screened from the corrupting influences of pride and indolent habits, inattention and ill humour: avarice will blast and poison its fruits, and falsehood and dishonesty will wither and destroy it.

It remains for me in conclusion to declare, in the name of the Philadelphia College of Pharmacy, that Dillwyn Parish, Charles D. Hendry, Edward Brooks and Isaac Jones Smith are graduates in the college, and to present to each the diploma of the institution.

Observations on some indigenous species of the genus Cantharis of Latreille, as fit substitutes for the Blistering Fly of the shops. By Elias Durand.

The word cantharis is an old name, which was given to several insects of very different characters. Aristotle applied it not only to one particular insect, but to many of those that are furnished with membranous wings and elytra, or wing-cases. It appears, from the testimony of Pliny and Dioscorides, who mention that the best cantharis was that of which the elytra are marked with transversal yellow stripes, that the blistering fly of the ancients was not the common Spanish fly of our shops, but the *mylabris cichorii*, which belongs to a different genus, and is still used in China for the same purposes as the *cantharis vesicatorius* is with us.

Linnæus applied this denomination to a great genus of coleopterous insects, that did not contain the common Spanish fly, and embodied the latter in his genus *meloe.* Geoffroy substituted the name *cicindela* for that of *cantharis*, employed by Linnæus, and established under the latter denomination a new genus, of which the blistering fly of the shops was the prototype. Degeer, who followed next, made several alterations in the genus *cantharis* of Linnæus, and proposed for several of its species the generic name *telephorus*, which would have been adopted, had not this appellation been already given to a vegetable genus of the family *fungi*. Finally, Fabricius, without adopting the alterations made by his predecessors, divided also the genus *cantharis* of Linnæus, and formed, partly from it and partly from the genus *meloe* of the same author, a new genus, under the name of *lytta*, corresponding with the *cantharis* of Geoffroy. However, the latter denomination has generally prevailed.

Ultimately Latreille, a celebrated French entomologist, established his natural family *trachelides*, which he divided into six tribes, viz. *lagriariæ, pychroides, mordellanæ, anthicides, horiales*, and *cantharidiæ*. The last tribe, genenerally formed of the genus meloe of Linnæus, is composed of eleven genera, viz. *cerocoma*[*], *hycleus*[†]; *mylabris*[‡], *œnas*[§], *meloe proprius*[‖], *tetraonix*[¶], *cantharis*[**], *zonotis*[††], *nemognatus*[‡‡], *gnantium*[§§], and the [‖‖]subgenus *sitaris*[¶¶].

---

[*] Geoffroy, Schaffer, Fabricius.

[†] Latreille. *Dices*, Dejean; *Mylabris*, Olivier.

[‡] Fabricius; Olivier; Latreille.

[§] Latreille; *Meloe*, Linnæus; *Lytta*, Fabricius.

[‖] Linnæus, Fabricius.

[¶] Latreille; *Apalus*, Fabricius; *Lytta*, Klüg.

[**] Geoffroy, Olivier; *Meloe*, Linnæus; *Lytta*, Fabricius, Dejean, Say.

[††] Fabricius; *Apalus*, Olivier.

[‡‡] Latreille, Zononis, Fabricius.

[§§] Kirkby.

[‖‖] Latreille; *Apalus*, Fabricius.

[¶¶] Dr Bretonneau, by experiments performed with the different genera consti-

Before entering upon the subject of which we are about to treat, we have thought it useful to introduce the history of the different names given to the common blistering fly, in order to show the reason why we find this insect described in the different works on materia medica under the various names of *meloe*, *lytta*, and *cantharis;* our knowledge of entomology is too limited to discuss the propriety of using one name in preference to the other; we will therefore limit ourselves to the remark, that the genus *meloe* of Linnæus, comprising insects very different in their physical characters and habits, is defective, and has been abandoned; that the name *lytta*, employed by Fabricius, had been needlessly substituted for that of cantharis, which latterly has been restored by Latreille, and generally adopted by European naturalists, and in the latest editions of the Pharmacopœias of Europe and America*.

The North American species of the genus *cantharis*, as yet described by entomologists, are about sixteen in number, five of which were discovered by Messrs Nuttall and Say, during the progress of the expedition of Major Long to the Rocky Mountains, and described by the latter of these naturalists in his American Entomology and in the Journal of the Philadelphia Academy of Natural Sciences. Some of these species, for size, multitude, and medicinal properties, are not inferior to the *cantharis vesicatorius*, and might easily supply our professional wants if properly attended to.

The object of this essay is to enable the reader to recognize, by the figure and description, the different species

---

tuting the tribe *Cantharidiæ*, has ascertained in a satisfactory manner, that the whole of them, the subgenus *sitaris* excepted, possess the vesicating properties in a greater or less degree.

* Although the London college, for reasons sufficiently weighty, were induced on a former occasion to transfer the blistering fly from the genus *cantharis* to that of *lytta*, the committee for revising the late Pharmacopœia determined, on the authority of Latreille, to restore it to its former genus. The work of Latreille, *Genera Crustaciorum et Insectiorum*, holds the highest rank in entomology of any hitherto published.—*Dr Paris's Pharmacologia.*

which deserve particular attention; to acquaint him with their habits and the period of their appearance; with the plants on which they commonly feed; with the manner of collecting and curing them; and finally, to prove, by the experience already acquired from the experiments of a great number of respectable physicians, and from a careful and comparative analysis of their chemical composition, that they are really deserving a particular notice, as an object of public utility. Let the farmers employ their children in gathering these insects, and every druggist and physician encourage their labour by liberally purchasing, and employing our indigenous cantharides, and the object in view will be attained. Indeed why, if we have at hand an article that may be advantageously substituted for the foreign one, should we not enjoy the wealth the country affords, rather than submit to pay a tribute to other nations?

Before presenting a sketch of the natural history of the genus cantharis, we have thought that a short description of the generic character of the meloe would not here be out of place, as much to show how inapplicable would this latter name be to the common Spanish fly and to the species which it is our intention to describe, as to notice another genus of insects possessing a vesicating power not inferior to that of the cantharis, and worthy also to be introduced into our materia medica.

Physical characters of the genus Meloe.

Fig. 1.—Meloe Purpureus.

*Tarsi** entire; *nails* bifid; *head* large; *thorax*† smaller than the head, almost cubical; *elytra* flexible, shorter than the abdomen, oval or angular, divergent; no wings; *abdomen* large and soft; *maxillæ*‡ bifid, straight, and compressed, the internal one truncated, the external larger, arcuated, and acute; *maxillari palpi*[*] longer, composed of four joints, the first of which is very small, the second and third large and triangular, the last ovoid; *antennæ*[†] moniliforme, a little larger than the head and thorax, composed of eleven joints, the first large and truncated, the second small and flattened, the rest rounded, and often irregular in the male.

---

* *Tarsi*, second joints of the feet.

† *Thorax*, the dorsal portion of the trunk, included by the dorsal sutures.

‡ *Maxillæ*, or *jaws*, one on each side of the mouth, immediately beneath the mandibles or upper jaws, moving transversely, usually corneous at base and membranaceous at tip.

These insects are easily distinguished from the canthárides and the other insects of the family *trachelides* by their slow and heavy motions, the large size of their head, the absence of wings, and by having the elytra shorter than the abdomen. They feed upon the leaves and flowers of different vegetables. These insects are seldom found in large numbers. Three or four species have been described as belonging to this country. The *meloe purpureus* represented in the plate, fig. 1, is common in the neighbourhood of Philadelphia.

Physical Characters of the genus Cantharis.

Tarsi entire; *nails* bifid; *head* cordiform, not produced into a rostrum[‡]; *thorax* narrower than the upper part of the head, nearly square, but attenuated in the interior part; *elytra* flexible, covering the whole abdomen, linear and semi-cylindrical; *wings* perfect; *maxillæ* with two membranaceous *laciniæ*, the external one acute within, subarcuate; *maxillari palpi* larger at tip; *antennæ* longer than the head and thorax, rectilinear; first joint longest, the second transverse, very short.

This genus is at once distinguished from the preceding by the form of the antennæ and of the head, which in the

---

[*] *Maxillari palpi*, articulated movable filaments near the middle of the dorsal edge of the *maxillæ*.

[†] *Antennæ*, or *feelers*, are two articulated organs of sensation situated on the head.

[‡] *Rostrum*, an immovable prolongation of the head, at the end of which is the mouth.

cantharis is cordiform, whilst that of the *meloe* is nearly square, by the absolute want of wings in the latter genus, and the linear and semi-cylindrical wing-cases of the cantharis.

Natural history of the genus Cantharis.

These insects make their appearance at different periods of the summer, and feed on the leaves and flowers of various vegetables. The *C. vesicatorius* is more abundant in the month of May and June, and feed, generally, on shrubs and trees belonging to the natural family *jasmineæ*, such as *fraxinus*, *syringa*, *ligustrum*, &c. Our species appear rather later, and are seldom seen before July or August; they are always more numerous when the season is dry and warm. These insects are generally very shy, and when disturbed, fall immediately from the leaves and attempt to conceal themselves in the grass.

The male is smaller than the female, and dies shortly after copulation has taken place. The female, when fecundated, acquires a considerable size, twice that of the male, and the eggs are so numerous that they very nearly fill up the whole cavity of the abdomen. The eggs are small, cylindrical, and curved lengthwise. The female agglutinates them in small masses, which are deposited in the ground, where the *larvæ* afforded by them undergo all their metamorphoses. The head of the *larva* is round, somewhat flattened, furnished with two *maxillæ* and four *maxillari palpi*, which constitute the mouth, and two short and filiform *antennæ;* the body is formed of thirteen *annuli*, generally soft and yellowish, supported by three pairs of short and scaly legs. It feeds on various roots and other vegetable substances. When fully grown it changes into *pupa**, and after a certain time emerges from the earth in a perfect state.

Under favourable circumstances, that is when the weather is hot and dry, this metamorphosis is so sudden, and the insects appear at once in such great numbers, that they have been considered as tribes of emigrating insects. It is then only that they are furnished with wings, and become capable of propagating. The white grain which has been observed in the abdomen of several species of cantharides appears, from examination of the recent insect, to be composed of the abdominal viscera, spermatic vessels and the ovaries. From the experiments of M. Farine, a French pharmaceutist, it appears that the blistering insects inhabiting southern exposures, have more power than those found in opposite situations; that the blistering property is more rubefacient in the male than in the female; that these insects, when immediately killed, have more activity than if preserved alive, even but a few hours, and, finally, that the time of copulation seems to be that, when the insects possess the greatest degree of activity.

---

* *Pupa* is the second state of the insect from the egg; it is often quiescent, the members being more or less concealed by the common integument.

The indigenous species of cantharides which may be employed as substitutes for the common Spanish fly are six or more in number, viz: *Cantharis nuttallii, C. albidus, C. vittatus, C. cinereus, C. marginatus* and *C. atratus*. The two first species are the largest of all; but they inhabit a section of country too remote, and as yet too thinly peopled to lead us to expect that they will be soon introduced into our market. The others have been known for a long time, and their properties satisfactorily ascertained by respectable physicians; they even have, in cases of scarcity of the European article, been advantageously exhibited in private as well as in hospital practice, and are said to be found, even at present, in the shops of the eastern states. These four species, as well as the *C. ænea, C. politus* and *C. aszelianus*, which are also of pretty considerable size, belong especially to the middle states, although, occasionally, found in some of the eastern and southern sections of our country.

Cantharis nuttallii, Latr.; *lytta nuttalii*, Say (fig. 2). *Body* glabrous; *head* deep greenish, with a rufous spot on the front, *antennæ* robust, surpassing the base of the thorax, rectilinear, black, opaque; *thorax* golden green; *elytra* red or golden purple, somewhat rugose beneath, green, polished; feet, black; thighs blue or purplish; *trochanters** armed with a conic spine near the base; obsolete or wanting in the female; length nine-tenths of an inch.

This insect inhabits the state of Missouri, and seems to be limited to the western region. It was first discovered by Nuttall. Mr Say mentions that this noble species surpasses in magnitude and splendour the famous Spanish fly, and possesses likewise the blistering properties.

Cantharis albidus, Latr.; *lytta albida*, Say (fig. 3). *Body* black, entirely covered with dense, prostrate greenish or yellowish white hairs; *head* with a longitudinal impressed line; *antenna* subglabrous, first and second joints rufous, the latter nearly equal in length to the first; *clypeus*†, *labrum*‡ and *palpi*§ pale rufous; *tarsi* black; *length* nearly one inch. Discovered by Mr Say near the Rocky Mountains‖.

Cantharis vittatus, Latr.; *lytta vittata*, Fabr. (fig. 4). *Striped cantharis*, or *potato fly*. *Head* light red, with vertical spots; *antenna* black; *thorax* black, with three yellow lines; *elytra* black, with a central longitudinal fillet, and the whole margin yellow; *abdomen* and *legs* black, covered with a cinereous down; *length* six lines. Inhabits the middle and southern states, but is rarer in the eastern sections.

This insect feeds principally on the wild potato vine; it appears about the end of July, and inhabits, as well as the following species, the soil at the foot of the plant. They ascend in the morning and afternoon, but avoid, generally, the heat of the sun at noon. It was first described by Fabricius in 1781, under the name of *lytta vittata*, and brought into notice, in this country, by Dr Isaac Chapman of Bucks county, Pennsylvania, who accidentally discovered its vesicating powers. Dr C. published a description of it, with the results of his experiments, in 1797, in the New York Medical Recorder. It appears from his account that he employed successfully, in several cases, all the parts of these insects, as vesicatories, with the same result, and even with a more certain effect, than the common Spanish fly. They have since been used by many practitioners, and have been mentioned by some as vesicating more speedily, with less pain, and without action on the urinary organs; but Dr T. W. Harris has satisfactorily ascertained, that when externally applied, they are capable of exciting strangury, and that the same effects follow their internal exhibition. We may suppose by analogy that all the other species act also in the same way.

---

* *Trochanters*, second joints of the feet.

† *Clypeus*, the superior portion of the head in coleopterous insects.

‡ *Labrum*, or *upper lip*; it is generally movable, and applied or placed immediately beneath the *nasus* and above the *mandibles*; it is sometimes entirely concealed.

§ *Palpi*, articulated movable filaments in the mouth of insects, generally shorter than the *antennæ* and divided into *labial and maxillary palpi*

‖ The vesicating properties of both these cantharides were ascertained by travellers. These insects were found feeding on a scanty grass, which they covered sometimes to a considerable extent. Mr T. R. Peale, who formed part of the expedition, tells me that, in one particular instance, they were so numerous and troublesome as to oblige them to sweep them off by bushels in order to clear a resting place for preparing their meal.

Cantharis cinereus, Latr.; *lytta cinerea*, Fabr. (fig. 5). *Ash-coloured cantharis. Body* black, covered with a cinereous down. All parts of the body and elytra entirely covered with an ash-coloured down, extremely short and dense, concealed beneath in the black colour of the insect. *Antenna* black, first and second joints very large in the male. It resembles the preceding species in figure and size.

The *cantharis cinereus* feeds on the leaves of the potato, of the English bean, wild indigo, and several other plants; it appears in July and August. Illiger was the first who, in 1801, recognized the vesicating properties of this insect. Dr J. Gorham addressed in 1808 to the Medical Society of Boston an interesting communication on the subject of this indigenous blistering fly, from which we learn, that for several years previous, Dr Israel Allen of Sterling, Massachusetts, had successfully employed, as a vesicatory, an insect found on the potato vine. Dr Gorham obtained a quantity of these insects, and by successive experiments established the character which has been given to them. These experiments prove that the powder, externally applied, produces a more speedy and thorough vesication, and a more abundant purulent secretion than the pulverized Spanish fly, with the same specific action on the urinary organs; and that the internal exhibition of the powder and tincture is attended with effects similar to those resulting from the administration of the same preparations from the common blistering fly of the shops. The properties of the ash-coloured cantharis have, moreover, been frequently tested by a great number of physicians in different sections of the United States. This insect seems to be one of the most important of our indigenous flies, from the long experience that has been acquired of its efficacy, and from its greater abundance and constancy of appearance, although it is represented as being less common than formerly.

Cantharis marginatus, Latr.; *lytta marginata*, Fabr. (fig. 6). *Marginated cantharis. Head*, *thorax*, and *abdomen*, black, but nearly covered with an ash-coloured down; *elytra* black, with margins and suture ash-coloured; upper part of the abdomen, under the wings, marked with two longitudinal lines of a bright clay colour; *length* about the same as that of the *C. vittatus*, but bigger and unlike in figure.

The marginated cantharis is, generally, found on the leaves and flowers of different species of the genus *clematis*. It makes its appearance about the beginning of August. Professor Woodhouse of Philadelphia was the first who took notice of and ascertained the vesicating powers of this fly, for which he proposed the name of *meloe clematidis*, from its being found especially upon several species of this plant. However, Fabricius had previously described it, as a native of the Cape of Good Hope, by the name of *lytta marginata*. Dr Barton pretends that this insect is one of the most active American species, and that it commonly feeds upon the leaves of the *clematis crispa* and *C.*

viorna. This observation led Dr Harris of Stirling, Massachusetts, to look for it upon the *C. virginiana*, which is very common on the banks of the river Neponset; nor was he disappointed in his expectations, for about the first of August, when the vine was in flower, he procured enough of these insects to make a fair trial of their properties, which proved to be fully equal to those of any species of cantharides hitherto employed for vesicatories. A few of them were found on the *ranunculus bulbosus* and not in the vicinity of the *clematis*. They are not, therefore, confined exclusively to the species of this genus. It has been observed that they resort mostly to such branches as trail upon the ground, and that they seldom frequent the superior part of the vine.

Cantharis atratus, Latr.; *lytta atrata*, Fabr. (fig. 7). *Black cantharis*. Entirely black, immaculate, resembling in general contour the preceding, but much smaller. Length of the male four lines; of the female, five or more. It is common in the middle states, and is also found in Barbary.

This insect feeds on the leaves and flowers of several species of *solidago* and *aster*; it has been found on the *prunella vulgaris, ambrosia trifida*, and occasionally on the potato vine. We have met with it in considerable numbers in dry and elevated fields about Hamilton village, near Philadelphia, invariably feeding on the *aster dumosus* and other species of *aster*, although several species of *solidago* and *ambrosia* were just as common as the first plant on the spot were we found them. They were in greater number in September, and continued to appear until the middle of October.

The *cantharis atratus* has been the subject of a paper published in the New England Journal of Medicine and Surgery, by Dr G. Oswood, who exhibited it in his practice, both in substance and tincture, without failing in a single instance to produce the desired effect. Dr Harris, from whose paper we have, in a great measure, derived the information we have given respecting the four last species of cantharides, mentions that he has been satisfied with the efficacy of the black cantharis, in many experiments he has made with it, and adds, that if any further evidence be wanted in its favour, we may find the strongest one in the fact that it is often substituted, from ignorance of the species, for the *cantharis vittatus*, without having either its virtue or identity questioned.

The three following species of native flies, which for size might also be recommended, have not as yet been tried, and we have had no opportunity of procuring them. The brassy cantharis, *cantharis æneas*, is a native of Pennsylvania, but appears to be scarce; it was discovered by Mr Say; its body is bluish green or dark brassy. The polished cantharis, *cantharis politus* and the *C. aszelianus* are both inhabitants of the southern states, and yet very little known. We have not been able to find any specimen of them in the cabinets of our city.

We shall give, in a subsequent number of this Journal, the results of our own experience respecting the vesicating properties of these different species of native cantharides, together with their chemical analysis, and directions for collecting and curing them for market.

[To be continued.]

On the Compound Syrup, and Fluid Extract, of Sarsaparilla. By William Hodgson, Jr.

[Read before the College, Nov. 24, 1830.]

Since the publication of Dr Hancock's paper in the Transactions of the Medico-Botanical Society of London, and which was copied into the Journal of the Philadelphia College of Pharmacy, (vol. i. p. 295, &c.) there can remain little doubt, that the frequent inefficiency of the Sarsaparilla arises chiefly from the careless or the erroneous manner in which it is generally prepared. Of all the forms in which this important remedy has been exhibited, perhaps none has obtained so little justice in its preparation, and consequently in the estimation of those who have to judge from its remedial effects, as the syrup. It is now generally conceded, by those who have paid any attention to the subject, that the effective principle of sarsaparilla, like that of many other vegetables, is entirely destroyed by long exposure to a boiling heat; yet all our authorized formulæ for the preparation of the syrup are liable to this objection. As far as my knowledge extends, they all direct it to be made by decoction in water, or by long continued hot infusion; and we have invariably, in consequence, two evils to endure—the presence of a large quantity of feculent and mucilaginous matter, which causes rapid decomposition; and, what is still worse, the absence of nearly all the active principle of the root, which has indeed been effectually *stewed down.* The French Codex, for example, directs two pounds of the root to be infused for twenty-four hours in twelve pounds of warm water, then boiled a quarter of an hour, and the residuum submitted to another, and still another boiling, with ten pounds more water each time down to six. The mixed decoctions are then to be again boiled, with the senna, &c. down to one half; after straining, the sugar and honey are to be added, and the whole boiled a fifth time, in order to form the syrup! Swediaur, in his *Pharmacopœia Medici Practici Universalis*, orders to boil the sarsaparilla twice in successive portions of water down to one third (nine pints down to three) and repeated; then to infuse the senna, &c.; and afterwards to boil again with the sugar and honey. The Antwerp *Pharmacopœia Manualis* directs the root to be infused in hot water for twenty-four hours, the infusion stewed down to one-third; this operation repeated twice with the dregs; the mixed liquors then reduced to one half; the herbs infused towards the end of the evaporation; and lastly, the sugar and honey to be boiled to a syrup in the infusion. It would be tedious to particularize further the various formulæ for this preparation, which are more or less similar to those I have detailed. The American Pharmacopœia of

1820 differs in no essential point. The London college has no compound syrup, but directs the simple to be made by maceration of the root in boiling water for twenty-four hours, evaporation to one half, (which must be done by continued boiling,) and, lastly, boiling and evaporation again after the addition of the sugar, to form a syrup of proper consistence. The boiling point of such a compound being higher than that of water, subjects it to an obvious additional disadvantage. Indeed, by a strange mistake, it seems to have been generally taken for granted, that long boiling was the best, instead of the worst mode of extracting the active principle from the sarsaparilla. Can we therefore be at any loss to account for the fact, that our *sirop de cuisinier* has none of the sensible properties of the sarsa, and often requires the assistance of mercury to give it any effect whatever?

To obviate the disadvantage of so inert a preparation, I determined, some months ago, to try a different process, and I have obtained a syrup, which has in perfection the characteristic acridity of genuine fresh sarsaparilla, and discovers no tendency to fermentation through the hottest part of our summer. The following is the formula, which I can confidently recommend for general adoption.

℞.—Rad. sarsaparillæ contus.	℔ij
Rad. glycyrrhizæ contus.	
Fol. rosæ rubræ,	
Fol. sennæ,	āā ℥ij
Ligni guaiac. rasi,	℥iij
Spir. vini tenuioris.	Ox

Digest for fourteen days, at a common temperature; then strain, express, and filter. Evaporate the tincture by a water bath to four and a half pints (so as to get rid of the alcohol,) then add, white sugar ℔viij, and form a syrup, removing it from the fire as soon as the sugar is dissolved. When cold, add

Ol. anisi,	gtt. vj
Ol. gaultheriæ,	gtt. iij
Ol. sassafras,	gtt. vj

previously rubbed down gradually with a little of the syrup. From these quantities I obtained seven pints of syrup, possessing, as I have said, the double advantage of the perfect extraction and preservation of the active principle, and the absence of any fermentable matter.

A somewhat analogous preparation of the sarsaparilla has lately been introduced into practice, under the name of the Compound Fluid Extract, which, if properly prepared, would contain the sarsa in a concentrated state, but which has hitherto suffered the same fate as its milder relative, the syrup. It has generally been prepared by evaporating the compound decoction and adding a little sugar; and consequently shares the disadvantages of that preparation in a still greater degree*. Applying to this preparation the principles on which I made the syrup, I have obtained a compound fluid extract of a very superior quality, and possessing in an eminent degree the active properties of the sarsaparilla. The following is the process:

℞.—Rad. sarsaparillæ contus.	℥xvj
Rad. glycyrrhizæ contus.	
Ligni guaiac. rasi,	
Cort. rad. sassafras,	āā ℥ij
Cort. rad. mezerei,	ʒvj
Spir. vini tenuioris,	Oviij

Digest for fourteen days at a common temperature; then strain, express, and filter. Evaporate the tincture in a water bath to twelve fluid ounces; then add of white sugar ℥viij, and remove from the fire as soon as the sugar is dissolved. Where the quantity made is considerable, it may be worth while to preserve the alcohol for future operations, by distilling instead of evaporating it. During the process a small quantity of resin separates by adhesion to the sides of the vessel, and which appears to be merely from the wood of the guaiacum. We have here a preparation, a fluid drachm of which contains in perfection the active principle of a drachm of sarsaparilla, and of which two fluid ounces are equal in strength, and similar in composition, to what one pint of the compound decoction of the Pharmacopœias would be, were it possible to prepare it without more or less destroying the active principle of the sarsa.

---

* If the decoction is so materially injured by the long boiling to which it is subjected, what must the common extract of the pharmacopœias be but totally inert? Yet a medicine, bearing the title of Compound Fluid Extract of Sarsaparilla, is extensively made in this city, chiefly from the common German extract, strongly flavoured with liquorice and sassafras, which disguise its total want of the flavour of sarsaparilla. It is put up in six ounce bottles, containing half an ounce of the extract, and enveloped in a wrapper, flowing with high encomiums on its "invariably salutary and beneficial effects," and containing the proprietors signature as a "caution" against "ignorant imitations" of so truly invaluable a remedy!

On Baume's Hydrometer.—By Daniel B. Smith.

The extensive use of the Pese-liqueurs of Baumé has imparted to it a degree of consideration to which it is not entitled either by the value of the scale or the accuracy with which it is generally made. Having had my attention turned towards the subject, every new fact respecting it which has come under my observation has strengthened the conviction that it is altogether unworthy of confidence. The original paper of Baumé does not state the specific gravity of the solution of salt which he employed, but says that a *prodigiously* rectified alcohol at 10° R. gave 40° of his scale. He then gives the volume occupied by various mixtures of rectified spirits and water, and the degrees they marked on his scale, from which the specific gravities corresponding therewith *as determined by him* may be found, viz.

Sp. V. Rect.	Water.	Sp. gr.	Deg. of scale at 5° R.
30 oz.	2 oz.	.8533	35
24 "	8 "	.8889	27
20 "	12 "	.9143	23
14 "	18 "	.9411	18
6 "	26 "	.9697	14
4 "	28 "	.9843	13
2 "	30 "	.9923	12

The experiments of Baumé are deficient in not marking the temperature at which the volume was measured after the mixture of the alcohol and water. So that we cannot be sure that we take the proper column of temperature in estimating the value of the sp. gr. The column which approximates the nearest is 5° R., which I have chosen.

In the first volume of Nicholson's Journal, an attempt is made by the editor to estimate the value of Baumé's scale. The spirit employed by Baumé is said by him to mark 37° at 0° R. and to be of a sp. gr. of .842. By consulting Gilpin's tables, Nicholson finds that alcohol of that strength marks .832 sp. gr. at 10° R. He then calculates the value of Baumé's scale at 10° R. by assuming 37° = .832; whereas if he had consulted the original table he would have found that the proper value of this spirit at 10° R. is 39° and not 37°. Nicholson then attempts to ascertain the value of 12° of the scale, and finds it, by his mode of calculation, to be .9905, and immediately afterwards, in the table he draws up, assigns .990 as equivalent to 11°. The erroneous value thus assigned to the scale of Baumé has been copied into nearly all the English treatises on Chemistry from that time to the present, and even in the Journal de Pharmacie for August 1830 I find it assumed as the basis of a calculation of the value of Cartier's scale.

The determination of this problem depends upon the sp. gr. of the saline solution, in which the hydrometer sinks to zero. The table of Nicholson makes this to be 1.0815, which is evidently incorrect. The tables published by Bussy and Boutron Charlard in their treatise on the falsification of drugs, would make it 1.07, which is too low. The very accurate compilers of the Pharmacopœia Batava estimate it at 1.075, which is probably correct, and agrees very nearly with my own observation. It also agrees with the original estimate of Baumé, for he states that prodigiously rectified alcohol, by which he means the strongest that can be obtained by simple distillation, is 40° at 10° R. By the table in the Pharmacopœia Batava this is equivalent to a sp. gr. of .828, which is the strongest alcohol that has been made in the manner referred to. Taking this as the standard, the following is the true value of Baumé's scale.

10	1.000	21	.929	31	.873	41	.823
11	.993	22	.923	32	.868	42	.819
12	.987	23	.917	33	.863	43	.814
13	.980	24	.911	34	.858	44	.810
14	.974	25	.906	35	.852	45	.805
15	.967	26	.900	36	.847	46	.800
16	.961	27	.895	87	.842	47	.796
17	.954	28	.889	38	.837	48	.792
18	.948	29	.884	39	.832	49	.787
19	.941	30	.878	40	.828	50	.782
20	.935						

Upon comparing this with the *observed values* of his scale given by Baumé, we find that, although the higher numbers agree, the lower numbers vary irregularly, a circumstance owing no doubt to the looseness of his estimates, for he appears not to have recollected that the value of each degree could be rigorously determined.

It is surprising how carelessly authors have written on this subject. Bussy and Boutron Charlard state that Cartier's scale is formed by dividing 15 of Baumé's degrees into 16 parts, and measuring these off each way from the point which marks 22 of Baumé, which is the only degree common to both scales. If this be correct, 10° of the former, which represents 1 in sp. gr., equals 9.2° of the latter. Yet in reducing the degrees of Gay Lussac's Alcoholmeter to Cartier's, they assume 10° of the latter to represent distilled water. In the paper in the Journal de Pharmacie which I have mentioned, the same value is given to 10° of Cartier, and 40° is said to mark .814, while in Bussy's table it marks only .827, and yet they both agree in their reduction of this scale to that of Gay Lussac's instrument.

The compilers of the Pharmacopœia Batava graduate their hydrometers for liquids heavier than water by the same scale of 10°, which is the basis of the aerometer. In Gray's Operative Chemist, and in the paper published in the August number of the Journal de Pharmacie, this scale is given as Baumé's hydrometer for salts. And yet in the scale of Baumé, the length of the first fifteen degrees was ascertained by a saline solution, containing fifteen parts of salt to ninety-five of water, and not one to nine for the first ten degrees, as in *his* aerometer and that of the Dutch chemists. The scales, it is true, very nearly agree, although founded on different bases.

These views of the subject must, it is believed, convince every chemist of the necessity of discarding these empirical instruments, and adopting an universal scale, founded on just principles, and not susceptible of variation.

Selected Articles.

A Botanical Notice of the different Genera and Species whose barks have been confounded under the name of Cinchona. By Prof. Decandolle. Translated for the Journal of the Philadelphia College of Pharmacy, from the Bibliothéque Universelle, (vol. 41. p. 144,) by John H. Griscom.

[Continued from page 241.]

III. *Remijia.*

Independently of the *buena hexandra*, Brazil possesses yet three other shrubs, whose barks are endowed with febrifuge properties. These shrubs, which were formerly known to Velozo, have been placed by him in the genus Macronemum, with which they have only slight affinities. M. Aug. de St Hilaire, who has carefully described and drawn them, places them in the genus *cinchona;* but it appears evident to me that they should form a particular genus, which I name Remijia, inasmuch as it was a surgeon of Brazil named Remijo who brought them into use; and as they are properly known in Brazil under the appellation of *Quinquinas of Remijo.* We are acquainted with three species. The remijias are essentially characterised by each cell opening on the back, instead of opening, as in the two preceding genera, by the untwisting of the partition. The border of the calyx is continuous, as in the true cinchona; the lobes of the corolla linear, as in the exostemma; the ovary is crowned by a very prominent fleshy disc; and the seeds are winged and downy. The appearance of these shrubs bears some resemblance to the true quinquinas. Their leaves are furrowed above and on the edges, and curled below. The branches and the nerves of the leaves are furnished with a reddish hair, the flowers are in groups, opposite, and disposed in elongated and interrupted bunches. The bark of the remijias is employed in Brazil, but does not form a part of those received in Europe by the name of quinquina.

IV. *Exostemma.*

Formerly many species were confounded among the true cinchonas, which were easily distinguished by their stamina proceeding from the corolla. Mr Persoon commenced giving some weight to this difference, by forming a section under the name of exostemma. In a memoir which I presented to the Academy of Sciences at Paris in 1806, I admitted this section as a distinct genus. A short time after Mr L. C. Richard, adopting the same opinion, published in the "Equinoctial Plants" of MM. Humboldt and Bonpland, (vol. i. p. 131), a detailed character of this genus, which he had had an opportunity of observing in the Antilles. Since that time it has been allowed by all naturalists. This genus exostemma is distinguished from the cinchonas by the lobes of the corolla being long and linear; its stamina proceeding out of the tube; its style jutting out and terminated by a stigma entirely bulbous, or slightly bilobed; by its capsule, which opens downwards by the unfolding of the partition; and lastly, by the seeds, which fold themselves downwards and not upwards. From so many organic differences, it is fair to infer considerable difference in properties. The barks of the exostemmas participate in the bitter and tonic properties of the true quinquinas; but they do not contain quinine; from which we may presume that they are not antiperiodical, and moreover that they possess decidedly emetic properties, and occasion much more frequent inclination to vomit than the true quinquinas. Notwithstanding these differences the barks of the exostemmas are known in the French Antilles under the name of *quinquina Piton,* because these shrubs grow upon the hills called Piton in these islands. They are also sometimes called *quinquina de Sainte Lucie,* from the name of the island whence the English physicians first obtained it.

The exostemmas present three well distinguished divisions.

The first, which I name *pitonia,* in order to recal the common name, is composed of nine species, all indigenous to the Antilles; it is here that we find the *exostemma floribundum,* which is the true *quinquina Piton* described by Badier in the "Journal de Physique," in 1789, and the *quinquina de Sainte Lucie* described by Davidson in the seventy-fourth volume of the "Philosophical Transactions."

The *exostemma caribæum* and some other species appear to possess the same properties. This division is characterized by the indentures of the calyx being divided even to the base of the border; by the tubes of the corolla being longer than the lobes; by the corolla being always smooth; and the stigma always entire.

The second division, named *brachyantherm,* is distinguished from the preceding by the tube of the corolla being shorter than the lobes, by the corolla being sometimes smooth and sometimes hairy, and the style sometimes entire and sometimes bilobed. It comprehends five species, of which four are indigenous to Peru, and one to the Philippines, which by reason of its seeds being but slightly winged, may be considered as a distinct genus. The properties of all these exostemmas with short corollas are unknown, and it is probable that they are of but little importance.

The third division, which I call *pseudo stemma,* is composed of two species discovered in Brazil by M. de St Hilaire. It is characterized by the border of the calyx being bell-shaped, or an entire tube, or slightly indented at the top. The corolla is always hairy without; its tube is shorter than the divisions; the stigma has always two lobes; the fruit is yet unknown. This division will probably one day be considered as a particular genus; one of these species bears in Brazil the name of *quina do mato*, which seems to imply that its external relation with the quinquina is known, but that its properties are very inferior.

V. *Pinckneya.*

Michaux the elder discovered this genus in Georgia near Saint Mary, and it has since been found in South Carolina; it is very easily distinguished from the true quinquinas, and from all the preceding species, by one of the five lobes being expanded into a foliaceous, membranaceous, coloured border, of very large dimensions compared with the four others. Notwithstanding this singular characteristic, M. Porret has not hesitated to unite it with the cinchonas under the name of *Cinchona Caroliniana.* We might identify it with the Mussœnda from which the *pinckneya* differs only by having the anthers slightly projecting.

The bark of the pinckneya is a popular febrifuge in its native country, but we are in possession of few authentic details of its efficacy and mode of action. It would be interesting to obtain them from the American physicians, for the pinckneya grows in the open ground in the gardens of the south of Europe, and if its medicinal qualities should deserve it, its naturalization would not be very difficult.

VI. *Hymenodyction.*

The five preceding genera comprehend all the American barks which have been, with more or less propriety, confounded under the name of quinquina. But the old world has likewise some trees or shrubs analogous to the cinchonas, by their forms or their properties, and which have been confounded with them.

The genus which Wallich named *Hymenodyction* comprises four species, one of which Roxburgh had described under the name of cinchona, and the three others discovered by Mr Wallich himself; all these plants are originally from the East Indies; their bark is bitter and astringent. The *H. excelsum*, which is well drawn by Roxburgh in pl. 106 of his Flora of Coromandel, is a large tree called in that country *bundaroo*, the wood of which competes with that of the mahogany; the history of the others is less known; the hymenodyctions are allied to the cinchonas by having the capsule opening in an inverted manner, that is to say, upon the back of the cells, and downwards, instead of opening upwards by the untwisting of the partition; their style projects considerably out of the tube, their anthers are small, their seeds are surrounded by a sloping wing at the base, and beautifully reticulated, whence is derived the generic name.

VII. *Luculia.*

After withdrawing the four preceding species, there still remained a tree of the East Indies which was regarded as a true quinquina. Mr Sweet has lately proved the contrary, and as this tree is known in India by the name of *Luculi Swa*, he has given this genus the name of *Luculia*. This tree is peculiar in sometimes having its style very projecting, in which case the stamina are concealed within the tube; sometimes the style is concealed in the tube, when the stanina are projecting. The calyx has five linear lobes almost filiform and caducous; the seeds are imbricated, not edged, but terminated by a very short wing. The properties of the bark are yet but little understood.

VIII. *Danais.*

Some distinguished botanists, such as MM. du Petit-Thouars and Bory de Saint-Vincent have been desirous of uniting to the genus cinchona some climbing shrubs, originally of the isles of Bourbon and France, and which the illustrious Commerson had designated by the poetical name of danaïs, from their flowers offering the same phenomena as the luculia, and the suppression of one of the sexes by the other affording a comparison to the manner in which the daughters of Danaïs smothered their husbands. Besides this peculiarity, and the great difference of their manner of growth, the Danaïs differ from the cinchonæ by the spontaneous opening of the capsule, and the shortness of the calyx. As to the properties of their barks, they are, it is said, bitter and astringent, but this is not well determined.

1. It results from the enumeration which I have just made, that the forty-six kinds of trees or shrubs hitherto more or less confounded in the books under the name of cinchona, compose eight distinct genera.

2. That what we understand of the properties of the barks of these eight groups, appears to announce a distinct relation between the external forms and the medicinal virtues; and that in particular, although all these barks may be useful in intermittent fevers, as bitters, or astringents, it appears that the cinchonas alone contain the quinine, and that probably they alone are endowed with the anti-periodical property.

3. That in particular the *yellow quinquina* of the European Pharmacopœias is produced by the *cinchona pubescens*, and probably also in part by the *C. purpurea*, and the *C. humboldtiana*. The *orange coloured quinquina* by the *cinchona lancifolia*. The *red quinquina* by the *C. scrobiculata* and the *C. magnifolia*. *Grey quinquina* of the first quality by the *C. condaminea*, and those of an inferior quality by a mixture of the different kinds.

4. That the eight genera obtained by the distribution of the old genus cinchona, are sensibly in accordance with the geographical distribution of these vegetables over the globe—the luculia and the hymenodyction in the East Indies; the danaïs in the isles of Australasian Africa, (Bourbon and France), the pinckneya in Carolina and Georgia; the remijia

in Brazil; the buena and cinchona in Peru and the Andes of Bogota; the genus exostemma is an exception to this regularity, but we may still observe that the true exostemma grows in the Antilles, the pseudo-stemma in Brazil, and the brachyauthes are divided between America and the Phillippines, with this circumstance, that that of the Phillippines, will perhaps form a distinct genus.

The considerations deducible from the studies of properties and of geographical distribution tend in this case, as in a multitude of others, to connect themselves with classification, and these various orders of knowledge lend to each other a mutual support.

Extract from a work presented to the Statistical Society of France, by MM. Payen, Secretary General of the Society, and Defresne.

(We presume the following statements respecting the condition and prospects of pharmacy in the department of the Seine, will be interesting to most of our readers. It is not probable there are any very material errors in the account, and we must confess our admiration for the zeal and attainments of our brethren of Paris is increased by the facts disclosed in the extract. While they are impelled by the spirit and knowledge of the age to scientific pre-eminence, their profession is trammelled with difficulties which essentially encroach on their pecuniary profits.)

The following table has been constructed from positive data and information, carefully collected from a number of the principal pharmaciens of Paris.

STATISTICAL TABLE

Of the Pharmaciens of the Department of the Seine.

Number of stores in Paris, 264; out of Paris, 21; total, 285.

Capital.	Amount of the stock of the 285 establishments,	Fr. 8,550,000	12,540,000
	Amount of rents, -	3,990,000	
	Interest on 12,540,000 francs at 5 per cent.		627,000
Hands employed.	11 Assistants, at 45 francs per month,	5,940	144,204
	40 do. at from 30 to 35 do.	15,600	
	80 do. 25 do.	24,000	
	140 do. 20 do.	36,600	
	12 do. 18 do.	2,592	
	23 do. 15 do.	4,140	
	15 Apprentices paying their board and instruction,	"	
	72 Apprentices receiving their board,	"	
	57 Laboratory boys and labouring men, at from two to three franks per day,	51,972	
	15 Female clerks, *dames de comptoir**, at from 400 to 500 francs per year,	6,450	
General expenses.	Patent, personal tax, fuel, lighting, and board,		761,000
Crude materials.	Exotic and indigenous, impure products of manufactories requiring purification,		1,320,000
	Total expenses,		2,852,294
General receipts.	Products of the laboratory, medicaments, prescriptions, &c.	3,264,800	3,275,800
	Retribution from pupils, or board of apprentices,	11,000	
	Nett profit,		423,500

Observations.—It results from this table that the nett profits of the apothecary on the capital in trade are something less than legal interest. The prosperity of the ancient shops was far from being so precarious; yet now, the competition in the sale of medicines, as well as in scientific researches, compels the apothecary to exercise his profession with greater care, to render his studies more complete, and increases the difficulties of his labours in the laboratory.

---

* This employment is quite unknown to us. We are told that a female clerk or *dame de comptoir* is attached to some of the principal pharmaceutical establishments in France, whose department is to receive the monies, keep the books, make out accounts, write the directions, &c.

The disproportion between the number of shops and the population may be regarded among the first of the several causes which have occasioned the decline of the pharmacies, as respects their pecuniary profits. Taking Paris as an example:—it has been established by the most accurate calculations, that it requires a population of 4000 souls to support an apothecary. Now, estimating the population of Paris at 700,000, it appears that it could be supplied with medicines by one hundred and seventy-five apothecaries, while it in fact contains two hundred and sixty-four, being a surplus of eighty-nine. From this population of 700,000 may be deducted one-seventh, who inhabit the hospitals, when diseased; allured, especially for three years past, by the Montyon legacy, and who, inscribed on the list of the indigent, derive their medicines gratuitously in the houses of relief, to the providing of medicines for which the apothecaries are now strangers, this advantage being withdrawn from those who were in possession of it in 1816.

As a second cause may be noticed the law of twenty-one Germinal, year eleven, (11th of April, 1802), which established medical juries, and ordained that the professors should be paid from the proceeds of admission, which, by thus placing the man between his interest and his duty, contributed to the multiplication of shops.

A third cause has been the inexecution of this same law, every way imperfect as it was, which has not been respected for twenty years, through the carelessness of the civil authorities, and of the school of pharmacy; perhaps, because of its insufficiency, which has given cause to regret the former juries, and to solicit the creation of chambers of discipline.

A fourth cause is the *prête-noms*, or name-lending; a new branch of industry, or rather of scandalous fraud, which permits every individual, a druggist, a grocer, an herborist, and even a fruiterer, to exercise the art of pharmacy, and to a pharmacien retired from business to traffic thus with his diploma at so much per annum.

Fifth cause; granting liberty to grocers to sell one hundred and sixty-four simple drugs.

Sixth cause; besides the grocers, druggists, herborists, and fruiterers, who all invade, as has been stated, the domain of pharmacy, it is our duty to invite the benevolent attention of the superior authorities to the sale of medicines, especially in the provinces, in the hospitals, bureaux of charity, and religious houses, by females or sisters, who are not subject either to rent, patent, fuel, or salaries of pupils; in fine, to none of those overwhelming expenses which crush the apothecaries.

It results from this state of things that the pharmaciens, alone limited to the exercise of their art, see this same art exposed defenceless to the invasion of many other professions, contrary to the principles of distributive justice.

Finally, we may enumerate also the simplification of medicine, arising out of the new medical doctrines, which indeed we cannot regret, if it may be regarded as the perfection of medicine; yet it is proper to notice in this place the influence it exercises on the condition of pharmacy.

The invasion of pharmacy by the neighbouring professions is productive of the greatest inconvenience ; the public loses its guarantee, its health is compromised, the law is forgotten, and the apothecary ruined. In order to better his condition it only remains for him to abandon a profession which is no longer protected by the authority of the law. However, it must be obvious to every one how important it is to society that the apothecary should have a proper latitude for the free exercise of his profession. The sale of poisons ought to belong exclusively to the apothecaries, (that is, the sale by *medicinal weight*), and it should be commenced by drawing up a new list of substances reputed poisonous, in place of that published the ninth Nivose, year 12, (9th January 1803), by M. Dubois, who was then prefect of the police.

The restraints upon the sale of poisonous substances should not exist, as it furnishes such a very slender revenue that pharmacy would not be the richer for it. Indeed most of the pharmaciens, preferring their tranquillity to a sale so slightly productive and so dangerous, have for a long time ceased to keep any poison, and thus the danger to society is very much increased.

Besides the 3,275,800 francs which represent in a mass the receipts annually made by the pharmaciens, the sale and exportation of secret remedies has produced from time to time very considerable revenues and profits. We have seen large fortunes rapidly accumulated on this single foundation, at the expense of an innumerable crowd of credulous people, who have not always proved the benefit of these *universal specifics*. It would be difficult to appreciate the importance of these sales, and very probably their gradual tendency will be to decline. If they amounted annually for some years to the sum of many hundred thousand francs, they scarcely, if at all exceed, at this moment, thirty or forty thousand francs, in the hands of eight or ten pharmaciens.

This partial traffic continues to be one of the evils which still oppresses pharmaciens. But the last judgment of the tribunals, and the interdiction of bills posted up, recently obtained, would remedy these disorders, if the judiciary and administrative authorities, well convinced of the utility of the measures already taken, would preserve a constant watchfulness, and not permit them to be almost immediately forgotten. But in effect, these abuses are renewed in all their force, and no legal process has been instituted against the relapse, up to the present time. B. E.

Memoir of the Iodates and Chlorates of the Vegetable Alkalies. By M. Serullas. Translated from the Journal de Chimie Medicale, by Franklin R. Smith.

I. *Iodates.*

I have detailed the action of morphia upon iodic acid. It is known that an immediate decomposition of the acid takes place, evinced by a considerable separation of iodine, and that I have pointed out this as a method to distinguish morphia from the other vegetable alkalies. It was then important to examine the habitudes of these bases with the same acid, the result of which is, that they combine to form saline compounds generally well determined.

Iodate of quinia.—Saturate the dissolved iodic acid with quinia. The liquor being concentrated and filtered hot, crystallizes on cooling, in the same manner as the sulphate of this base, that is to say, in silky needles. These crystals are quickly decomposed by heat, leaving a charry residuum.

Iodate of cinchonia presents itself in very slender prismatic crystals, grouped into very regular and very white amianthoid tufts. This iodate is instantly decomposed by heat, the residuum swelling up and charring.

Iodate of strychnia.—Heat moderately a solution of iodic acid with strychnia; the liquor acquires the wine-red colour. This solution concentrated, placed in a dry place after filtration, gives, if the strychnia be pure, long transparent needles united into bundles, having a superficial rose colour; washing upon a filter with a very small quantity of cold water decolours them. They are very soluble in water, and are immediately decomposed by heat.

If the strychnia be impure, the distinctness of the crystals will be variable.

I had at first thought that the colour which results from the action of the iodic acid dissolved and heated with strychnia depended upon the presence of a portion of brucia, which is frequently found mixed with it; but I have observed that very pure strychnia of Boliquet's preparation, which did not redden at all by nitric acid, has afforded a colourless and perfectly crystallized iodate, whilst the mother-water was excessively coloured. This effect, therefore, may be noted as a character belonging to this iodate. The iodate of strychnia, like all the salts of that base, is a violent poison. Rabbits were killed more or less promptly by one and a half grains.

Iodate of brucia.—Brucia combines with iodic acid, but the product has not the form of distinct crystals. The solution has a red colour. If small acicular crystals are formed at first, they are owing to the presence of magnesia, which forms an iodate but little soluble. This happens also in the preparation of iodate of strychnia. Nitric acid colours iodate of brucia of a bright red.

Iodate of veratria.—The solution of iodic acid and veratria being evaporated, takes by the desiccation the appearance of gummy matter under a crystalline form, as has been observed of the compound of veratria with other acids.

Narcotine and picrotoxine are soluble in iodic acid by heat, without neutralizing it. By evaporation these two substances crystallize in the midst of the solution of the acid, which contracts no union with them.

It should be observed that the results will vary much unless pure matter be operated upon, and as most of the alkaloids of commerce are impure, it is necessary before employing them, (except they be of one's own preparation), to dissolve them in concentrated alcohol; filter to separate foreign matter and crystallize. Strychnia should be purified by the proper method.

The above mentioned iodates are more or less soluble in water and in alcohol. By heat some at first melt; the most of them are immediately decomposed, with a slight explosion, in this case affording, beside the gaseous products, iodine and a considerable deposit of carbon. Iodic acid being susceptible of detonating by percussion, it is conceived that the iodates should possess the same property.

The sulphurous acid poured cautiously upon these substances, that it may not be in excess, separates the iodine, as it does with all the iodates. Ammonia precipitates the base.

A generic character of the iodates of the vegetable alkalies is the property of precipitation on the addition of a slightly concentrated solution of iodic acid to the neutral solutions. A very acid-iodate is immediately formed, which settles to the bottom after a few moments, and may be separated by decantation. These acid-iodates are colourless; lightly washed and dried they detonate readily at a temperature a little elevated. Some of them have exploded by the friction of a metallic blade used to detach them from the sides of the vase, to which they adhered. No charry residuum remains after their detonation, the excess of acid consuming the carbon. Exposed to the air, they change after a certain time, and acquire more or less colour.

The principal object of the preceding remarks is to show the very remarkable difference which the iodic acid presents in its contact with morphia and the other alkaloids, at ordinary temperatures. We see that morphia, whether free or combined, exerts upon this acid a very prompt decomposing action, whilst the other bases, notwithstanding the analogy of decomposition which exist between them, unite with it to form salts heretofore unknown. Their existence being now published, the healing art may perhaps find some use for them. Is it not possible that we may obtain from the vegetable alkalies, thus combined with acidified iodine, and more especially from the compounds of quinia and cinchonia, remedial properties different from those produced by the sulphates of these two substances, and to direct usefully, by a well measured application, the energy, often disastrous, of the other alkaloids?

We may the more reasonably expect this, since in the present instance the iodic acid which saturates the vegetable alkalies, in abandoning so easily the iodine by the contact of organic matter; at a slight elevation of temperature, differs so materially from the sulphuric acid, the permanency of which is well known; consequently, these iodates may be expected to produce particular effects, differing from those by the sulphates.

Mr Donné, a young and industrious chemist, in his researches upon the alkaloids, has characterised iodine, brome, and more particularly chlorine, as powerful antidotes to the poisons of this class. He has proposed to distinguish the vegetable bases from one another by means of microscopic observation of their crystalline forms, obtained by spontaneous evaporation of their solutions in concentrated alcohol. I believe, after the trials that I have made, that the same method applied to the iodates and chlorates of the alkaloids offers results equally constant and proper, to recognise the nature and base of either.

II. *Chlorates.*

The combination of chloric acid with the alkaloids is easily effected by heating the acid with these bases. The resulting salts are very remarkable in their crystalline forms; like the preceding, they are more or less soluble in water and alcohol, at ordinary temperature, and much more so by heat.

The presence of lime or magnesia, so frequent in the alkaloids of commerce, presents less inconvenience in the preparation of chlorates than of the iodates, because the chlorates of lime and magnesia are very deliquescent, whilst the iodates of these bases are very little soluble.

Chlorate of morphia.—Long and very slender prisms decomposed immediately by heat, leaving a residuum which swells up and chars. Nitric acid colours it yellow, and not red, as happens with the other salts of morphia.

The chlorate of morphia acts as promptly upon the iodic acid as the other salts of that base. The iodine is equally set free, an effect which we did not anticipate; the analogy between the iodic and chloric acids leading us to infer that the combination of morphia with the chloric would prove as permanent as with the iodic acid. This fact generalises the character of iodic acid with regard to morphia, wherever it may be found.

Bromic acid also appears to be decomposed by morphia. I caused a little of this acid to act upon morphia; the liquor took a yellowish colour, which deepened as the evaporation proceeded, without affording any crystals.

Chlorate of quinia.—Very slender prisms united into tufts. Heated, it melts into a colourless fluid, which solidifies on cooling, taking the appearance of a transparent varnish. If the heat be continued it is suddenly decomposed with the usual explosion.

Chlorate of cinchonia.—Prisms in handsome large plumy tufts of a beautiful whiteness. Heat effects almost the same changes upon it as upon the preceding salt, only it is less fusible and sooner decomposed.

Chlorate of strychnia.—The solution acquires a rose colour by heat. The salt crystallizes in the form of delicate short prisms, grouped *en rosette.* If the solution is concentrated, it forms a mass on cooling.

Chlorate of brucia.—Diluted chloric acid being heated with brucia to effect the combination, the liquid acquired a red colour, and crystallized on cooling into perfectly regular transparent rhomboids, precisely similar to carbonate of lime. These crystals, separated from the liquid, are still a little reddish, but may be obtained colourless by a new solution and crystallization; the liquid acquires no more colour; the salt is little soluble, less so than chlorate of strychnia, which permits their easy separation.

The chlorate of brucia, like brucia itself, has the property of reddening deeply by nitric acid. It is suddenly decomposed by heat.

Chlorate of veratria does not crystallize, but is reduced by evaporation to a layer of a gummy aspect, and an amber colour.

If a somewhat concentrated solution of iodic acid be poured into a solution of one of the above mentioned chlorates, it immediately forms a curdy precipitate of an acid-iodate, which may be entirely separated by strong alcohol. The chloric acid remains in the liquid, for if the chlorate is dissolved in water, the alcohol which is added becomes so much weakened by the mixture, that no precipitate ensues; but it may be determined immediately by the addition of iodic acid, which alone is not disturbed by weak alcohol, although it is precipitated almost entirely by strong alcohol, and a long repose.

To ascertain the correctness of these views, iodic acid, and afterwards concentrated alcohol, were poured into a solution of one of the chlorates of the alkaloids; it was there thrown upon a filter and washed repeatedly with alcohol. The matter remaining upon the filter being dissolved in water, was saturated with pure potassa and evaporated. The residuum, heated to redness in a tube, was dissolved and treated by nitrate of silver, then by ammonia, and filtered to separate the iodide of silver. Nitric acid being now added in excess, produced no disturbance, whilst the same course pursued with the alcoholic solution, set aside, saturated, evaporated, &c. afforded an abundance of chloride by the nitrate of silver.

It was a natural inference on seeing the chloric acid displaced from its combination with the alkaloids by the iodic acid, by reason of the formation of an iodate, but little soluble, that the deliquescent chlorates, such as those of lime and magnesia, in like manner should give a precipitate of an iodate of these bases and free chloric acid; and such is the fact.

Further, in applying the principle of very different solubilities, I treated by iodic acid a solution of chlorate of potassa, a salt of much greater solubility than the iodate. By concentration and crystallization, if the iodic acid be in excess, we obtain an acidiodate; if the contrary, a neutral iodate. Then, by pouring into the remaining liquid concentrated alcohol, you precipitate any chlorate of potassa which may be present, and have pure chloric acid.

Iodic acid, added in sufficient quantity to the watery solution of sulphate of quinia, made by means of sulphuric acid, throws down an acidiodate. The portion of acidiodate that remains in solution may be separated by concentrated alcohol, which retains the sulphuric acid.

The *hydrofluoric acid* enters into combination with the alkaloids. The results are the same whether the simple or silicated acid be employed; if the latter, the silex is separated in the process. The salts formed redden litmus paper, and when the solutions are hot, very strongly. Sulphuric acid poured over them disengages hydrofluoric acid.

The *hydrofluate of quinia* has a shining white colour, and crystallizes in very slender needles. A solution of boric acid, boiled with quinia, gives, by cooling, a borate of quinia in granular crystals. When a solution of quinia or cinchonia, with a large excess of either simple or silicated hydrofluoric acid, is submitted to spontaneous evaporation in a stove, they dry into the form of a transparent varnish, which being redissolved, is excessively acid, and repasses to its primitive state by a new desiccation.

Boric acid in excess with quinia has afforded by a like evaporation a matter resembling varnish.

Analysis of the iodate and chlorate of cinchonia.

Two decigrammes of iodate of cinchonia, dissolved in a sufficient quantity of water, gave by ammonia,

Cinchonia dried with care, the mean of many experiments, - - - - - 1.136 dec.

The liquid treated by caustic potassa evaporated, and the residue heated to redness, afforded by nitrate of silver, and washing with weak nitric acid,

$$\text{Iodide of silver} \quad 1 \text{ dec.} = \begin{cases} \text{silver,} & 0.4686 \\ \text{iodine,} & 0.5314 \end{cases}$$

representing,

$$\text{Iodic acid,} \quad 0.7014 = \begin{cases} \text{iodine,} & 0.5314 \\ \text{oxygen,} & 0.1700 \end{cases}$$

On making a comparison between the known compositions of sulphate and iodate of potassa, we find the proportion in weight from the first to the second to be : : 1 : 4.1. The same relations appear to exist between the sulphate and iodate of cinchonia; therefore we may establish the composition of the latter as follows:

Iodic acid,	6.97	34.85
Cinchonia,	13.03	65.15

Two decigrammes of the chlorate of cinchonia, treated in the same manner, excepting the modifications which the difference between a chloride and an iodide require, gave the mean of many experiments,

Cinchonia,	1.52		
Chloride,	0.70	Chlorine, Silver,	1.73 5.27
representing			
Chloric acid,	0.368	Chlorine, Oxygen,	0.173 0.195

which leads us again, after the relation of the composition of the chlorate and sulphate of potassa, where the sulphuric and chloric acids are, : : 1 : 1.86, to give that of the chlorate of cinchonia

Chloric acid,	0.404	19.48
Cinchonia,	1.596	80.52

On the Preparation of the Schweinfurt Green. By Creuzburg, Chemist, at Octingen.

[Abstracted from KASTNER'S ANNALS, vol. xviii. page 285.]

The Schweinfurt green was first employed in the arts in the year 1816. It is the finest green the arts possess, and is extensively used in Germany.

This pigment has, until now, been improperly considered as an arsenite of copper. According to Mr Creuzburg's opinion, it is a triple combination of arsenious and acetic acids with the oxide of copper. Mr C. explains this reaction in the following manner: "verdigris is a compound of subacetate of copper and an excess of oxide of copper; the arsenious acid combines with the free oxide and with a portion of that of the subacetate, which is converted into the state of a neutral acetate combining with the arsenite of copper thus formed. In support of his theory Mr C. has ascertained that the acetate of copper existing in the Schweinfurt green contains exactly the neutral acetate that corresponds with the quantity of subacetate which has been employed."

Such are the process and interesting details that Mr C. has been good enough to communicate to the public. Of all the different processes that have been proposed, he considers that which is given in Kastner's Annals, vol. xii. page 446, as the best and most practicable. It consists in dissolving arsenious acid in boiling water, treating this solution with verdigris, and boiling the whole until a precipitate is formed. All the other methods have been tried by this gentleman and rejected by him as defective. Thus the employment of sulphate of copper has been acknowledged as bad, and yielding a more than indifferent product.

The difficulties encountered in this preparation consist especially in a *tour-de-main*, peculiar manipulation, which is still kept a secret by the manufacturers. The following conditions must be scrupulously attended to, in order to obtain a handsome colour: the proportions of arsenious acid and verdigris must be eight parts of the former and ten or eleven of the latter; the arsenic must be dissolved in one hundred parts of boiling water, and the verdigris, formed separately in a soft paste or *magma*, with a sufficient quantity of water, must be mixed and boiled with the solution of arsenious acid; but this operation requires the most particular attention, for the slightest circumstance produces considerable alterations in the shades of the product.

The solution of arsenic should be boiling when the verdigris is added to it, and the ebullition suspended during the time the mixture is made. A precipitate of a dull yellowish green colour is produced, which, by a protracted ebullition, assumes the beautiful colour called Schweinfurt green; but the pigment thus afforded has not a shining appearance; it resembles a mixture of the superfine article with twenty per cent. of pure alumina. This is the first and a very great disappointment. Another, which is no less important is, that the precipitate thus obtained is very considerable, and retains the water which is mechanically incorporated with it so as to dry very slowly.

To avoid these failures, the operation should be carried on rapidly over a smart fire, and no more than two minutes ought to elapse between the introduction of the verdigris into the arsenical solution and the formation of the precipitate. The slower the reaction takes place the duller the colour. When the operation is rapid, the precipitate, instead of being light and voluminous, is compact and heavy; it falls down at once, instead of forming slowly.

When the precipitate has subsided, a blue liquor, disengaging a good deal of acetic acid, floats on the surface. With a compact precipitate this liquor becomes clear at once, and may be decanted without danger of carrying away or even disturbing the colour. This liquor is preferable to pure water for dissolving the arsenious acid which is to be used in the subsequent operations. By treating the arsenic with water, the first boiling affords commonly a dirty precipitate, which ultimately unites with the pigment and tarnishes its lustre: but, however, there is no advantage, according to the experiments of Mr Creuzburg, in using that liquor for diluting the verdigris.

The *magma*, or verdigris paste, is prepared by mixing gradually a sufficient quantity of water at 40° *centigrade*, (108° Fahr.) and stirring incessantly the mixture until it has acquired a sufficient degree of consistence to be able to pass through a common-sized hair sieve; but it is necessary not to go beyond this limit for two reasons, which contribute to render the addition of a larger proportion of water very injurious to the result: first, the temperature would be too much reduced; secondly, the verdigris seems to undergo a modification in its chemical composition by too great a dilution in water, and affords a brown precipitate. The temperature of the water should never be beyond 108°, and the *magma* must be still warm when added to the arsenical solution.

The verdigris of Grenoble is preferable to that of Montpelier. The former is harder and contains a larger proportion of neutral acetate of oxide of copper, whilst the other is more contaminated with impurities, and cannot be easily pulverized. These foreign matters remain incorporated with the pigment, and form in it small black specks. When the Montpelier verdigris is employed it ought simply to be reduced into pieces of the size of a walnut.

It is also very important to have the arsenious acid pulverized for the purpose, because the common pulverized arsenic is very seldom pure, and is generally adulterated with sulphate of baryta, sometimes even in the proportion of fifty per cent.

Such is the abstract of the information given by Mr Creutzburg. It is well calculated to remove the difficulties and precariousness of this preparation, and to instruct those who may wish to undertake the manufacture of this article. —*Translated from the Annales de l'Industrie Française et Etrangére.*

E. D.

Minutes of the College.

At a meeting of the Philadelphia College of Pharmacy, held June 29th, 1830, it was resolved that a public commencement be held for the purpose of conferring degrees on the candidates for the diploma of the College, and that Dr Benjamin Ellis, Joseph Reakirt, and William Marriott, be a committee to make the necessary arrangements for carrying the same into effect.

September 28th, 1830. The College is informed, through the minutes of the board of trustees, of the election of Samuel Elliott to associate membership.

The following report was read and accepted, and the committee continued for further attention to the subject.

To the Philadelphia College of Pharmacy.

The committee appointed at the last meeting to make the necessary arrangements for carrying into effect the resolution of the College, *viz.* "that a public commencement be held for the purpose of conferring degrees on the graduates of the College," report, that Henry Troth, Esq. one of the vice presidents of the institution, has very kindly complied with their request to deliver an oration on that occasion, and they propose that the commencement be held on the 25th of October, at seven o'clock in the evening, or at such hour as the College may apppoint. All of which is respectfully submitted, and your committee beg to be discharged.

Signed, BENJ. ELLIS,
JOS. REAKIRT.

The semiannual election for Trustees resulted in the choice of the following gentlemen:—Dr Benjamin Ellis, Algernon S. Roberts, Charles Schaffer, Jun., Samuel P. Griffitts, Jun., Samuel F. Troth, Dr George B. Wood, William Hodgson, Jun. and Joseph Scattergood.

October 26th, 1830. The Committee continued from last meeting report,—that a Public Commencement was held on the 25th inst. and an address delivered by Henry Troth. Three of the four graduates attended, and received their diplomas.

On behalf of the Committee,

BENJ. ELLIS,
JOS. REAKIRT.

Resolved, that the thanks of the College be presented to Henry Troth for his interesting address on that occasion; that a copy of the address be requested for publication, and that the same be referred to the Publishing Committee.

A communication being made to this College by Dr George B. Wood, on behalf of the "Publication Committee of the Convention, for the formation of an American Pharmacopœia, requesting the College to examine the revised edition of that work prepared by them, it was

Resolved, that a committee of three be appointed to confer with the Publication Committee on the subject; and that Daniel B. Smith, Henry Troth, and Dr Benjamin Ellis constitute that committee.

November 30th. A communication from William Hodgson, Jun. on the Compound Syrup and Fluid Extract of Sarsaparilla, was read and referred to the Publishing Committee.

December 28th. The following report from the Committee appointed to confer with the "Publication Committee of the National Convention," was read, adopted, and the Committee discharged.

To the Philadelphia College of Pharmacy.

The committee appointed to examine the revised edition of the Pharmacopœia of the United States, having carefully performed that service, report,—that the convention of physicians appears to have subjected the Pharmacopœia of 1820 to a severe scientific scrutiny, and the work now offered to the examination of the College is greatly improved, in almost every respect, upon the former. The Committee, therefore, unanimously agree to recommend to the College to pass a resolution approving of the same, and enjoining upon its members to observe the formulæ thereof in their pharmaceutical preparations.

DANIEL B. SMITH,
HENRY TROTH,
BENJ. ELLIS.

Philadelphia, 12*th Month* 21*st*, 1830.

It was on motion resolved, that this College do approve of the revised Pharmacopœia of the United States for 1830, prepared by the convention of physicians which met at Washington in January of the present year; and that the members of the College be recommended to use the formulæ thereof in their pharmaceutical preparations.

The following was also adopted:

Whereas information is received that a School of Pharmacy is founded by the College of Pharmacy of New York, in which regular lectures on pharmaceutical science are delivered and diplomas granted; and whereas the interests of science would be promoted by establishing a friendly intercourse with that College, therefore,

Resolved, that a regular apprenticeship with a member thereof, and the attendance of one full course of lectures in that School of Pharmacy, be sufficient to entitle a student who may attend one full course of lectures in the School of Pharmacy in this College, and undergo the required examination, to receive the degree of Graduate of Pharmacy therein.

Resolved, that the corresponding secretary be directed to communicate the foregoing resolution to the president of the College of Pharmacy of New York, and to request, on behalf of this College, that the favour may be made reciprocal.

CHARLES ELLIS,
Secretary.

Review.

The Pharmacopœia of the United States of America, by the authority of "the General Convention for the formation of the American Pharmacopœia," held in 1830. *Second Edition: from the First Edition, published in* 1820, *with Additions and Corrections. New York: published by S. Converse. November,* 1830.

If there be any other department of learning than the revision and correction of the text of writers in the classical languages of antiquity, in which a spirit of severe criticism may be laudably indulged, it is in the examination of such a work as a Pharmacopœia. The preparation of a "code of medicines," is, in the present state of science, a task requiring microscopical minuteness of research, accurate learning, and extensive practical knowledge. Europe may be said to abound in Pharmacopœias of great merit, suited to the uses of particular districts. Each of these contains, in addition to what may be called the common stock of medicines, that, peculiar to its own locality, and therefore marking it with distinctive characters. Neither is there any want of works of great learning and value upon the natural and chemical history of drugs. Some of the most eminent natural philosophers of the age have not thought it beneath them to illustrate the science of pharmacy by their labours; and there is therefore no excuse left but indolence or ignorance, for any gross errors in so important a work as a Pharmacopœia. The skill displayed in its compilation may for this reason be viewed by strangers as no unfair index of the state of science in the community which is satisfied with the performance; for in a work requiring, not extraordinary talent, but merely patience, research, learning and accuracy, we may rest assured that the skill which the public sentiment requires will soon be brought to the task. We are therefore disposed to examine every work of the kind which issues from our press with jealousy, and to give it a close scrutiny, and we seize the present, which is our first opportunity of vindicating the rights of the Journal of the College of Pharmacy to sit in judgment upon so important a matter.

In the first place, we have a right to expect in a Pharmacopœia, the most lynx-eyed revision of the press. Not an error in a letter or a figure should be suffered to escape uncorrected. Secondly, the Pharmacopœia should be complete in itself and symmetrical in its parts. Every medicine used in its formulæ should be found in its list of officinals; the name given in the officinal list should be observed in giving the titles and ingredients of the compounds. The scientific nomenclature should be in accordance with the knowledge of the age; clear references of authority should always be given; synonyms should be marked as such; and the part of the animal, plant, or mineral used, should be strictly noted. A wrong process is an unpardonable blunder. The language should be terse and unequivocal. There may be various opinions respecting the value of formulæ for the pharmaceutical preparations, but the points we have been considering are capable of being accurately estimated, and we shall therefore, in examining at some length the work before us, confine ourselves chiefly to them.

The American Pharmacopœia of 1820 was marked throughout with the carelessness and undue haste of its preparation. The prospect of a revision rendered the medical public patient of these defects, and as the authors of the edition before us profess to have used every endeavour to render it worthy of the profession in this country, and of the present advanced state of medical science, we presume that the whole work is adopted by them as their own. We shall point out, as we proceed, the principal changes which have been made in the arrangement, nomenclature, and preparations.

The compilers of the Pharmacopœia of 1820, adopted, for reasons into which we shall not here inquire, the name of the drug as its officinal title, and added the scientific name of the plant or animal as explanatory. The authors of the present work return, in the greater number of cases, to the nomenclature of the London College, yet with singular carelessness leave the names unaltered throughout the body of the work, presenting one set of names in the catalogue of materia medica, and another in the lists and formulæ of preparations. For example, the Pharmacopœia of 1820 call scammony, scammonium. The present work styles it, "scammonii gummi resina," yet gives us confectio scammonii, and not conf. g. r. scam. which should be its title on the principles adopted in the nomenclature of the materia medica. It is needless to point out how much this discrepancy disfigures the book. A further alteration has been made by incorporating in the materia medica short descriptions, of from one to five or six lines in length, of the qualities and properties of the drugs. These descriptions are so short and general as to be of little value, useless to the apothecary, because they do not in general enable him to discriminate one drug from another, and to the physician, as being altogether in short general terms. The Pharmacopœia of 1820 arranged its catalogue in two columns; the first of which contained the Latin, and underneath that, the English name of the medicine; and the second the scientific name of the plant, animal, or mineral which yields it, the authority for the name, and the part of the plant or animal employed in medicine. This arrangement is natural and perfectly intelligible and harmonious. The work before us, however, discards the latter two of these. We are not told the authority for a single scientific term, nor, except where it forms part of the name of the medicine, are we informed in general what is the part used. Take, for example, the article ichthyocolla, which reads thus in the old work—

Ichthyocolla, *Isinglass,*	Acipenser huso, *and some other species.* Vesica natatoria, *the swimming bladder.*

In place of this necessary information to the student we simply have—

Ichthyocolla, *Isinglass,*	Acipenser huso, et Acipenser ruthenus.

It is time to turn from these general observations to a more detailed examination of particulars. The first change we have to remark upon is that in the species of aconitum. Stoerck, who first introduced the aconite, supposed that the species he used was the aconitum napellus, and the plant was so designated in the British Pharmacopœias. It has been since ascertained that he employed the neomontanum, and the compilers of the Dublin and American Pharmacopœias adopted that as the officinal species.

The very accurate and learned editor of the Pharmacopœia Batava, in noticing this error of Stoerck, says of the A. neomontanum, "Recte a Pharmacopœia Americana receptum, usu ceteris prius." The present editors have restored the A. napellus as their officinal species, without any other reason, we suspect, than that they so found it in the London Pharmacopœia. This, we think, is a retrograde and not a forward step, as respects "the present advanced state of medical science."

We meet on the same page with the aconite, the singular scientific synonym, alcohol *officinale*, and should be glad to be informed in what modern work on chemistry alcohol is so designated. A more serious criticism upon this article is, that *it does not give us the specific gravity of standard alcohol, nor are we once informed of it throughout the work.* The same remark may be made respecting sulphuric acid, and what renders the omission the more singular is, that the old Pharmacopœia designates it in both cases.

In page sixteen we find aloes called extract of socotrine and hepatic aloes. Now we submit that *aloes* is the name of the extract and not of the plant.

The socotrine is said to be yielded by the A. spicata; A. socotorina and A. perfoliata, and the hepatic or Barbadoes aloes, by the A. vulgaris, A. hepatica, and A. barbadensis. We doubt whether the two latter are the names of well ascertained and admitted species. Although it is known that several species of the genus furnish aloes, it is most probable that the aloe spicata and aloe perfoliata furnish those kinds which are met with in commerce. Nineteen-twentieths of the aloes used in this country come from the Cape of Good Hope, and yet our editors do not notice that peculiar well defined variety of the drug.

Alum is said to be a bi-sulphate of alumina and potassa. The composition of this salt is not clearly understood, although the most probable opinion is, that it is a sulphate of alumina combined with a sulphate of potassa, or, as others think, with a bi-sulphate of potassa. In neither case is the name here given correct.

Antimonium sulphuretum is neither good Latin nor correct nomenclature.

Aqua distillata is introduced very improperly into the materia medica, in place of aqua fontana, it being properly one of the *præparata*, among which, accordingly, we again find it.

Baptisia tinctoria. This plant is strangely called *indigo brown*, instead of its proper name, *wild indigo.*

Boletus *ignarius* should be *B. igniarius.*

The proper kind of lime stone to be used in the preparations should have been designated, as many contain a large proportion of silex and magnesia. Here, also, the present edition departs unwisely from the old, which designated chalk and marble as the kinds to be used. It should have said crystalline or primitive limestone.

Both the former and latter work are deficient in designating what is meant by phosphate of lime, which occurs as a native mineral in large quantities. They should have defined it to be *calcined bones*, which is the article that is always used.

Under the head of cantharides, the synonyms of Olivier, Linnæus, and Fabricius for that insect are given as the names of insects used in medicine. There is nothing said to distinguish them as mere synonyms from the names of different insects. A similar remark may be made of the scientific names of the cardamom seeds, and many other articles which refer to the same plant, while those appended to the article camphor and some others, refer to widely different substances, and yet no distinction between the two cases is pointed out.

Cloves are said to be the unexpanded buds of the E. C. They are the unexpanded *flower* buds.

The red and yellow cinchonas are still referred to the C. cordifolia and C. oblongifolia, although it is now well ascertained that these species of Mutis yield only the inferior red and yellow barks of Carthagena.

Cornu cervi is referred to the cervus elaphus, the European deer. We think that our own *cervus virginianus* is better entitled to a place in our national Pharmacopœia than any foreign species.

A singular blunder occurs in page 33, where elaterium is said to be *elaterii pepones!* The physician who should follow the book, and give half a grain or a grain of the pepones, would be sadly astray.

The erigeron canadense is the only species of erigeron given, although, as far as we have any knowledge, the species used are the E. philadelphicum and E. heterophyllum.

Of the punica granatum, the bark of the root and the rind of the apple are both used. The book simply says pomegranate bark, without designating which of the two is meant.

Guaiacum is called a resin, although it is well understood to be a peculiar vegetable principle.

Of *Iodine* it is said that at 347° F. it rises in a beautiful violet-coloured vapour. The fact is, that iodine melts at 225° F., enters into ebullition at 347° F., but sublimes slowly at temperatures below that of boiling water.

The bark of *the root* of sassafras is the part used, although it is not so designated.

Under the head Opium we are told that its active principles are *two alkaline* substances termed morphia and *narcotine!* Apart from the disputed point, as to the power of narcotine upon the living system, it is very clear that it is no alkali.

Petroleum is said to be called scientifically *bitumen petroleum.* The term bitumen is a generic appellation; and is applied in strictness to the solid bitumens rather than to the bituminous oils. The term petroleum is strictly correct for the mineral tar, and bitumen petroleum as a scientific term is inadmissible.

In the description of phosphorus it is said to take fire at 148° F.; whereas, it is well known that it inflames by friction at a much lower temperature.

Pinus australis is given as the name of the officinal species, in place of pinus palustris, the name adopted in the old Pharmacopœia. The change is certainly injudicious, for Pursh, Elliot, Muhlenberg, Nuttal, Torrey, and all our most accurate botanists have rejected the appellation of Michaux, and termed the species referred to the *P. palustris.*

The pipsissewa is called a pyrola; but we think the character upon which Pursh founded his genus chimaphila is too natural and well defined to be rejected; and it has, with the exception of Sir J. E. Smith, been sanctioned by succeeding botanists of eminence.

We venture to raise a doubt respecting the Latinity of *rhi* as the genitive of *rhus.* It is so declined we know in Ainsworth, and Pliny and Celsus are cited as authorities;

yet, in the chapter of Pliny which is quoted, the ablative of rhus is written *rhue*, from which we infer that it must be of the third declension. It is obviously derived from the Greek Ῥους, which makes ῥοος in the genitive.

Under the article Rhubarb it is stated, that the East Indian, or Chinese, occurs in oblong flattish pieces, *seldom perforated.* This information will undoubtedly be new and interesting to our apothecaries!

The rosa gallica, which was omitted in the former Pharmacopœia, is very properly restored to its place in the materia medica. Yet even here, in the very act of correcting, we observe the characteristic carelessness of the editors; for in the description given of the rosa centifolia, with a reference, as we presume, to the error in the former edition, it is said that the rosa centifolia is used only in making rose-water and syrupus rosæ. Let the reader turn to the chapter on syrups, and he will find that there is no syrup of roses among the preparations.

Salix eriocephala. We decidedly object to making this willow the officinal representative of the American salices. It is described, we know, by Bigelow as the *swamp willow* of New England; but Michaux, who is the only other author in whom we have found it described, speaks of it as a native of Illinois; and neither Pursh, Nuttal, nor Torrey, recognise it as a species.

The super-carbonate of soda of the shops is a sesquicarbonate, and not a bi-carbonate of soda.

Borax, which from its alkaline taste was formerly called a sub-borate, is now ascertained to be a *bi-borate,* and not a *borate* of soda, as stated here.

The spigelia marilandica is translated Carolina *bark!*

Sponge is said to contain *phosphate of iodine!* a very curious discovery truly; we shall perhaps be told next of *phosphate of oxygen.* The truth is, it contains, according to a late careful analysis, the carbonates of lime, magnesia, and ammonia, hydrochlorate of soda, *ioduret* of iron, and traces of *phosphate* of soda.

The systematic name of amber is said to be succinum electrum! which is probably a misprint for succinum electricum, the term used by Linnæus in his Systema Natura; but who now quotes Linnæus as an authority in mineralogy?

The virtues of tobacco are supposed to reside in a peculiar proximate principle termed *nicotric.* By whom, pray?

The winter's bark is left without its scientific cognomen, which is nevertheless ascertained. It is the *drymis winteri* of Forster and De Candolle.

There are several of the botanical names in this catalogue of materia medica, the propriety of which seems doubtful.

Myrrh, for example, is referred to the balsamodendrum kataf. Forskhal is the traveller upon whose authority this determination rests. He described the plant which he was informed yielded myrrh, under the name of amyris kataf. This was subsequently placed in a new genus and named balsamodendrum kataf. A recent German traveller, Ehrenberg, actually gathered the myrrh on a distinct species of the same genus, which has received the name of *B. myrrha,* and is therefore entitled to the preference.

With respect, also, to myrospermum (p. 21) as the genus of the plants yielding the balsams of Tolu and Peru, it is most probable that along with the Toluifera of Linnæus this genus must be merged in the myroxylon of later writers. Humboldt, Mutis, and Lambert, all attribute these balsams to different species of the latter genus.

Kino is attributed (p. 41) to the *pterocarpus erinacea* and the *coccoloba uvifera.* The former plant yields the African kino of Dr Fothergill, which is not found at present in commerce; and the extract furnished by the latter is called *false kino* by the continental writers. There is another sort of the true kino which is sometimes seen in this country, brought from the East Indies, which is obtained from the *nauclea gambir;* a fourth sort, procured in New

Holland from the *eucalyptus resinifera;* and a fifth from an Indian tree, the *butea frondosa.*

We have not exhausted our critical notes on the nomenclature of this part of the work, but must content ourselves for the present with observing that it is disfigured by gross typographical blunders; for example, Acidum hydro-*cloricum*, p. 14; Myroxolon for myroxylon, p. 21; Caryophillata, p. 25; Cassia pulpa, p. 26; Cinchonia, p. 28; Curcuma langa, p. 32; Gualtheria procumbers, gentiania, p. 26; Marubium, p. 44; Villosæ, p. 54, as the genitive of villosus; Criocephala for eriocephala, p. 55; Sclerotium flavus for S. clavus, p. 57; plunt for plant, p. 60; Taraxici and taraxicum, p. 62; *tatty* for tutty, p. 66. We may remark, by the way, that the description of this latter substance is not very accurate. Emmenagogue is spelt throughout the whole book with a single m.

In turning from the Materia Medica to the Preparations, it may be observed that the editors of the present edition have improved many of the formulæ by conforming them to the London Pharmacopœia. In so doing they have avoided a gross blunder into which the convention of 1820 fell. They adopted as their general standard the formulæ of the Edinburgh college, in which the quantity of liquid used is given by weight and not by measure. They substituted measure for weight, however, in copying these formulæ, without making the requisite allowance for the difference between troy pounds and wine pints; so that the tincture which originally was made with two wine pints in the London Pharmacopœia, and with two and a half troy pounds in that of Edinburgh, was ordered in the American to be prepared with two and a half wine pints! Another error of the Pharmacopœia of 1820 was the neglect to distinguish between troy and fluid ounces, or between weights and measures in the formulæ containing liquids of different specific gravities. The editors have corrected this mistake in the present edition, and have been so unnecessarily precise in their anxiety to be accurate, that in every case where a liquid is ordered by the pound, they direct it to be *a pound by weight.* A number of new and useful formulæ have been introduced, although the book is very far from fulfilling in this respect the expectations held out in the preface. Among the new preparations may be mentioned those of the sulphates of quinia and morphia, and strychnia.

It is very extraordinary that no processes are given for obtaining either of these alkaline principles, the discovery of which is undoubtedly the most important acquisition our science has gained in modern times. This is the more inexcusable as the mode of preparing them is described in all the modern treatises, and especially as they are not enumerated in the list of materia medica.

The first change which strikes the eye in this part of the work, is the omission of the Latin directions and explanations prefixed to many of the subdivisions of the work in the old Pharmacopœia, and the substitution of new ones in English. The Pharmacopœia, as a work in the Latin language, is thus mutilated; and the change has been made in a very careless and superficial manner; thus, under the head of Distilled Oils, there are no Latin directions for their preparation, and yet the Latin reader is informed, "hoc modo paranda sunt." To descend again to particulars.

The proportions used in making the acetum scillæ, are very properly changed to those of the London college, viz. two ounces to the pint.

The *strong acetic* acid is also a new and very proper addition to the preparations.

The *acetum distillatum* of the old edition is called *acidum aceticum dilutum,* and is ordered to be made from *acidum aceticum impurum,* which in their list of materia medica is the *scientific synonym* of vinegar, their pharmaceutic term for which is *acetum.* The old Pharmacopœia did not fall into this incongruity.

The formula for the purified vinegar of the old work is retained, and is used in preparing the medicated vinegars. We are sorry to find it here, and had hoped that it would be rejected from every future edition as a useless and abortive recipe.

Diluted sulphuric acid is very properly altered to about half the strength of the former edition, being the standard of the London college.

The convention of 1820 did not direct their sulphuric ether to be rectified, an omission we are glad to see supplied in this edition.

The liquor aluminis compositus of the London Pharmacopœia is introduced, page 74, yet the water is altogether omitted!! The quantities of alum and white vitriol ordered, require two pints of boiling water.

The ammoniated alcohol is also altered from the Edinburgh to the London formula; so that it is now an alcoholic solution of subcarbonate of ammonia and not of ammonia. The disadvantages of this change are obvious, for we cannot obtain so strong a solution of the salt in diluted alcohol as of the alkali.

The mode of preparing the solution of carbonate of ammonia is altered to the simpler plan of the London and Edinburgh colleges, viz. by dissolving the subcarbonate.

In making the hydrosulphuret of ammonia, the present and former editions both direct the sulphuretted hydrogen to be prepared from sulphuret of antimony and dilute muriatic acid. Had the editors condescended to try the experiment, they would have discovered the impossibility of obtaining a single cubic inch of the gas by this method. The London college directs the gas to be made from *sulphuret of iron* and dilute muriatic acid, a process which succeeds perfectly. Many of the books on chemistry order sulphuret of antimony to be *heated* with *strong* muriatic acid, which is also a good mode of preparing it. In attempting to combine the two, our American editors have contrived a formula which is absolutely worthless.

In the preparation of aerated waters it is directed to impregnate them with ten volumes of gas. We doubt whether our strongest seltzer waters contain more than six or eight times their bulk of carbonic acid.

The absurd direction of the former Pharmacopœia for making lime water with boiling water is no longer retained.

Cerates are defined to be compounds of oil, &c. of a consistence between plasters and ointments. Yet the recipe for simple cerate, page 85, is altered by omitting the spermaceti, and increasing the proportion of wax, so as to render it identical with their own simple ointment, p. 157.

The confection of cassia is altered to the London formula. The confection of roses is made with the astringent rosa gallica, and not with the laxative rosa centifolia—one of the strange absurdities of the old Pharmacopœia.

The decoction of Peruvian bark is made with a pint of water to the ounce, instead of a pint and a half.

The decoction of sarsaparilla is altered from six ounces to eight ounces per gallon.

In turning to the chapter on plasters we are struck with another example of the superficial manner in which this revision has been made.

Purified ammoniacum and galbanum are directed to be used in several cases; but in no part of the book is the apothecary told how they are to be purified, nor do they enter, except in their crude state, into the list of materia medica. We may remark, in passing, the definition given of plasters, viz. that they are adhesive solid compound substances *spread* upon leather, linen, or silk! Are they not then plasters if spread upon paper or muslin, or when in rolls? Among the new formulæ under this head, we are tempted to quote one as a model of pharmaceutic brevity.

"*Emplastrum galbani,*
℞. *Galbani quantumvis!*"

The English translation directs *purified* galbanum.

We are glad to see the compound galbanum plaster restored to its place, and could wish the emplastrum thuris had been given in place of the emplastrum ferri of the old Pharmacopœia, which is very properly omitted.

The lead plaster is made with five parts of litharge, instead of four, to eight of oil, and the directions are more clear and precise for the preparation than in the former edition.

We have at the end of the plasters a new preparation of tobacco, translated snuff plaster, instead of tobacco plaster, as it undoubtedly should be.

Among the extracts we have those of lettuce, poppy, and taraxacum, from the London Pharmacopœia, one of sanguinaria, which is a new and useful addition to our officinals, and one of the spiræa tomentosa.

The rob of elder is very inappropriately placed in both Pharmacopœias among the extracts. If preserved at all, it should rank with the confections.

Several obsolete preparations of iron are omitted, but we cannot praise the retention of the red oxide. It was admitted into the former Pharmacopœia because of its use in the emplastrum ferri, which is omitted in the present work. It is not used as a medicine, and enters into no officinal preparation. Its place would have been well supplied by the sulphate of iron, which should always be prepared for internal use by the apothecary himself.

The process for making calomel is taken from the London Pharmacopœia, and is nearly that of Hermstædt, differing from it in using less muriate of soda, although there appears to be enough, according to the scale of equivalent numbers. Proper precaution is taken in the recipe to get rid of any accidental bichloride.

The infusion of flaxseed is ordered to be made with flaxseed meal! The mucilage is well known to be contained in the outer skin of the seed, and to be yielded perfectly by the unbruised seed, which makes a far nicer and more palatable infusion, free from the oil which the bruised seed yields abundantly.

The Latin formula for infusion of roses very properly directs the rosa gallica; the English is a copy from the old Pharmacopœia, and directs "*roses*:" another striking proof of the haste with which this revision has been made.

Among the liniments we have a *liniment of* iodine which deserves notice, and is made with one part of the tincture of iodine and eight parts of soap liniment.

The soap liniment is altered so as to contain twice as much soap and four times as much camphor as before.

The musk mixture is omitted; although often ordered of the apothecary by the practitioner, and for that reason, if for no other, deserving a place.

Mixtures of sulphate of morphia, sulphate of quinia and croton oil are introduced; the two former by the improper titles of mixtura morphiæ and mixtura quiniæ. The former of these contains a grain of the sulphate in a drachm of the mixture.

The mixture of the sulphate of quinia contains two grains to the ounce; which we think much too dilute. A grain to the drachm is a more common and convenient proportion.

In page 118 they have copied from the London college a recipe for mucilage of starch—which article they have not made officinal!

The editors have apparently bestowed more care upon the chapter "Pilulæ" than upon any other part of the preparations, having added twelve new formulæ and stricken out seven. Among those introduced are the pills of strychnia, sulphates of quinia and morphia, piperine, croton oil, lupuline and iodine. The latter of these, by the way, appears to us to be a very injudicious form of preparing and administering iodine. We never have seen any lupuline which could be formed into a mass fit for dividing into pills per se.

We cannot commend the addition of Dover's powder to the calomel pills. It may be a very useful recipe in its place, but the introduction of it has deprived the Pharmacopœia of the simple calomel pill, an important and much used preparation.

The editors have attempted to improve the pills of corrosive sublimate of the former edition, without much success. It would be difficult to select an example of more complete failure than that, in the attempt to contrive a formula. The convention of 1820 appear to have added the muriate of ammonia with the intention of rendering the sublimate soluble in a small quantity of water, and thus securing its exact distribution throughout the mass. As regards the mere subdivision of the salt, this might have answered their purpose; but then the chemical relations of the two salts were overlooked, and it was not recollected that a triple muriate, having peculiar properties of its own, was formed. But the process by which they attempted to accomplish this did not at all answer their expectation; instead of dissolving the sublimate in the solution of muriate of ammonia, they first mix it with arrow-root and direct it to be made into pills by moistening with a solution of the ammoniacal salt. The idea of forming the pills with arrow-root—a substance insoluble and immisceable in cold water, was altogether absurd. So far as the mere mechanical part of the process goes, the editors of the present edition have avoided these errors. Their formula is still, however, liable to the censure of the editors of the Pharmacopée Universelle, who, after introducing the preparation under the title of "pilules mercurielles ammoniacales" observe "C'est à tort que la Pharmacopée d'Amerique donne à ces pilules le nom de pilulæ hydrargyri oxymuriatis. La formule elle-même est mauvaise, et doit etre rejetée."

The pills of compound extract of colocynth of the first convention contained a fourth part of oxide of antimony, and are much used in this city by the name of Fothergill's pills. In the present edition the name is retained, but the antimony is omitted.

The *strong acetic acid* is directed to be prepared from *sugar of lead*. On turning to that article in page 127, we find that it is to be made with *strong acetic acid!* So that the apothecary is first to buy sugar of lead for making acetic acid, and then to use the acetic acid thus obtained for making sugar of lead for his shop.

The recipe for preparing acetate of potassa is liable to objections. In the first place, it is not clear what acid is to be used, for the book is divided against itself; the Latin student being ordered to use purified vinegar, and the

English, distilled vinegar. The preparation of acetate of potassa by either of these is a troublesome and difficult process, and is to be excused in the old book only on the ground that it contained no better acetic acid. There can be no excuse for not using the strong and pure acetic acid, which is officinal in the present edition, and with which the salt in question is easily and beautifully made.

Subcarbonate of potassa is ordered to be made from the impure supertartrate, which is not in the list of officinals. The subcarbonate is also inserted among the materia medica.

Both editions direct sulphate of potassa to be made from the salt which remains after the distillation of nitric acid, and yet contain no process for the preparation of that acid. It is truly surprising that so gross a blunder as this should have passed into a second edition!

The carbonate of soda is directed to be made by passing a stream of carbonic acid through a solution of the subcarbonate, which, though better than the method used in the first edition, is not in advance with the knowledge and practice of the day.

The strength of the spirit of camphor is double that of the old Pharmacopœia.

The syrup of poppies of the London Pharmacopœia is advantageously introduced into the present edition; but the capsules of the poppy are not in the list of officinals.

The syrup of quinia should have been prepared with the same proportion of tincture of sulphuric acid used in the mixture of quinia. The sulphate of quinia is not soluble in syrup, and forms a hard coherent mass in the course of a few days. It is not strong enough for the convenience of the practitioner; a grain to a drachm would be a better formula.

In the syrups of sarsaparilla and of sarsaparilla and guaiacum, p. 140, the old edition is copied verbatim, and the species of roses to be used is not distinguished. We presume it should be the rosa centifolia.

The tincture of aloes and myrrh is very judiciously conformed to the London formula; the change made in the composition of this valuable tincture by the convention of 1820 was ill advised.

On page 143 the *extract* of *liquorice* is directed to be used, although not elsewhere noticed in the work.

The tinctures are in general made to agree with the London standard, which is, we think, decidedly the best.

In no other case is this so clear as in the preparation of tincture of muriate of iron, in which about half the quantity of acid formerly ordered is now used, thus rendering the evaporation to get rid of the great excess of acid unnecessary, and furnishing besides a milder and more uniform tincture.

We must again notice the use of articles in the preparations which are not enumerated in the materia medica, viz. the red saunders, p. 135, prunes and figs, p. 87.

The tincture of colombo, a valuable and popular preparation, is unaccountably omitted.

The tincture of guaiacum of the old Pharmacopœia was made with one pound of the guaiacum to two and a half pints of alcohol; it is reduced in the present book to three ounces to the pint.

The tincture of hops is also reformed; that of the former edition was a clumsy mode of preparing tincture of lupuline. In the directions in the present work for preparing this latter tincture, the lupuline, which they define to be a yellow powder, is ordered to be *bruised!* The mode of preparation is somewhat singular; an ounce of lupuline is to be digested for six days with two fluid ounces of alcohol; the liquor is then to be pressed out and filtered, and enough alcohol added to make three fluid ounces. The virtues of the lupuline would have been more effectually extracted by adding the whole of the alcohol previous to the digestion, and we see no reason whatever for deviating from the usual mode of proceeding, especially as the solution is so strong an one.

The tincture of myrrh is directed, as in the old Pharmacopœia, to be made with diluted alcohol, a process which no skilful apothecary will ever follow.

Laudanum is restored to the London standard, an alteration which we think is conformable to the practice of the best apothecaries. We are glad to perceive that Dr Hartshorne's acetic tincture of opium is introduced, p. 149, and wish it had entirely superseded the black drop, an uncertain and wasteful preparation. The name which they have bestowed upon the black drop, viz: impure acetate of morphine, is, by the way, most unchemical and unpharmaceutical.

In looking over the ointments, we perceive that the simple ointment of galls is exchanged for one containing camphor; and that the ointment of rose water, an elegant and useful preparation, is omitted. The unguentum hydrargyri nitratis fortius is made with too much lard. Had the editors been practical apothecaries, or had they attended to the criticisms of A. T. Thompson on this preparation, they would have given us a better formula.

The proportions directed for the unguentum hydrargyri nitratis mitius, which immediately follows the former, afford another example of the extremely superficial manner in which this work has been edited. The Latin text directs it to be prepared "eodem modo ex adipe et oleo triplici"—according to which direction the ointment contains one part in sixteen of nitrate of mercury. The English text, on the other hand, says it must be made "in the same way with three times the quantity of lard," which will make an ointment containing one part in ten of the nitrate. The unguentum picis is directed to be made, as it should be, with suet, and not with wax, as in the old edition. An ointment of iodine is introduced containing one part of iodine to eight of lard.

The antimonial wine is copied from the last edition, and the solvent employed, viz: wine and water, is but a poor substitute for good Teneriffe wine. When proper care is taken in the selection of the tartar emetic and the wine, the preparation will remain for months unaltered; but by making it so nearly a watery solution as is here directed, the spontaneous decomposition is much facilitated.

The colchicum wine is directed to be made with two ounces of the recent bulb to a pint of wine. It may be objected to this formula, that the recent bulb cannot be generally procured in this country, and that the tincture is too weak. The first objection lies against the recipe of the old Pharmacopœia, but we prefer its proportions, viz: one part in two, to those in the present edition.

It is only in its dried state that the American apothecary can procure the colchicum; and amidst the uncertainty as to the degree of solubility of its active principle and the extent of the injury it suffers in drying, we much prefer what may seem a wasteful and extravagant mode of preparing the wine, so as to be certain of obtaining a saturated tincture. We have accordingly been in the habit, for some years, of preparing our wine of colchicum with one part of the dried bulb and two parts of Teneriffe wine; and we have always succeeded in obtaining a tincture of great efficacy and certainty in its operation.

The directions given in both editions for the preparation of acetate of zinc are curiously inconvenient. The quantity of this salt which the apothecary is directed to make at each crystallization is *one drachm!* If it be said that the proportions are nevertheless correct, we answer that the quantity of water is so immoderately great, that, for the preparation of a pound of the acetate, the sulphate of zinc and acetate of lead are to be dissolved in twenty gallons of water, and this is afterwards to be nearly all evaporated before the salt will begin to crystallize. A single gallon of boiling water would undoubtedly be enough for the purpose. If it be asked how the convention stumbled upon these quantities, we refer to the London Pharmacopœia where these proportions and quantities, and the same process (excepting the evaporation) are used for making the solutio acetatis zinci; they copied it, as they did too many other formulæ, without adequate reflection.

The oxide of zinc is directed to be made by precipitation from the sulphate, and not by sublimation from the metal, as in the last edition.

We may remark that this portion of the work is also much disfigured by typographical errors, many of which are repeated in the index.

In the examination to which we have subjected the work before us, we have confined ourselves chiefly to a comparative view of its merits as compared with the former edition. Although the simple circumstance of having gone through the revision with the London Pharmacopœia in their hands as a standard, has enabled the editors to correct a number of injudicious formulæ, yet we are decidedly of the opinion that, upon the whole, they have utterly failed in their undertaking. The work is in many respects decidedly inferior to its predecessor, and that in the very points where improvements and superiority were to be expected. It has evidently been prepared in haste, and the attention of the editors directed to a few prominent points, to the neglect of others of as much real importance. Even in the additions they have made of the new chemical medicines, they have omitted one of the most useful and important—the hydriodate of potassa; nor have they taken any notice of the disinfecting chlorides.

With all these imperfections the work could not, under any circumstances, gain the confidence of the profession, nor be received as the general standard. The transactions connected with its history are calculated still further to impair public respect, and to dispose us to receive with favour the Pharmacopœia prepared by the Washington Convention of 1830. In our next number we hope to have the opportunity of subjecting that work to the same close scrutiny we have bestowed on this. We shall then take occasion to enter intó a more elaborate criticism of the value of the formulæ of both Pharmacopœias than it has been in our power to do in the present article, which is already protracted to an undue length by the severity with which we have felt ourselves compelled to scrutinize the minor details.

Miscellany.

On Salicine, by MM. Jules Gay-Lussac and J. Pelouze.—Salicine, when pure, is a perfectly white substance, crystallized in prismatic needles. Its taste is very bitter, with something of the aroma of willow-bark.

100 parts of water, at the temperature of 19.5° (67° F.) dissolve 5.6 parts of salicine. Heat increases its solubility, and boiling water appears to dissolve it in all proportions. It is also soluble in alcohol, but ether and the essential oils, at least that of turpentine, appear not to take up the least portion.

Concentrated sulphuric acid poured upon salicine gives it a fine red colour, perfectly like that of bichromate of potassa. Hydrochloric and nitric acids dissolve without colouring it. Gall nuts, gelatine, neutral acetate of lead, alum and tartar emetic do not precipitate it from its solutions.

Boiled in excess with lime water it does not saturate it; it is not capable of dissolving the oxide of lead.

It melts at some degrees above the temperature of boiling water, and on cooling forms a crystalline mass. It loses no water in this operation. If the heat be pushed a little beyond the point of fusion, it acquires a citron yellow colour, and the brittleness of resin.

Salicine burned with the oxide of copper, in an exhausted apparatus, afforded a gas entirely absorbable by potassa. The mean of two careful analyses gives for its composition,

Carbon	55.491	100
Hydrogen	8.184	
Oxygen	36.325	

Or in proportionals,

Carbon	2.028	proportionals
Hydrogen	2.004	
Oxygen	1.	

Salicine then is composed of

Two proportionals of Carbon,
Two do. Hydrogen,
One do. Oxygen,

Or it may be represented by two volumes of olefiant gas, and one volume of oxygen.

Preparation of Salicine.—M. Becquerel has read to the Royal Academy of Sciences a note on the preparation of Salicine, sent to him by M. Peschier of Geneva. The author in the first place endeavours to ascertain which species of willow affords the most salicine.

The white willow, (Salix alba, Lin.) from the bark of which some journals have announced that MM. Fontana and Rizatelli had procured salicine, contains but a very small quantity, susceptible of crystallization, for like that of the S. hastata and S. præcox, it is uncrystallizable and excessively bitter.

The bark of the young branches of the Salix monandra variety of the S. helix, though he subjected it to the most rigorous operations, had afforded him but two drachms to the pound of dried bark, whilst M. Leroux said that he had obtained four times as much, and hoped, when he operated upon a large scale, to double that. It is true that he employed branches of three or four years, whereas M. Peschier has not been able to procure any except those scarcely a year old.

The narrow leaved willow, Salix incana, Lin. is rather richer in salicine than the preceding, but of most difficult extraction, owing to the mucilaginous and colouring matters with which it is united. M. Peschier effected its extraction as follows:

After being bruised, the bark was boiled in water for one or two hours, and filtered by expression. To the liquid, subacetate of lead was added until no farther precipitate ensued, then filtered, and carried it to the boiling temperature, adding a sufficiency of carbonate of lime to decompose the excess of acetate of lead which it contains, to saturate the acetic acid and to decolour it. The liquid was permitted to become clear, decanted, and the deposit washed two or three times. These solutions being united and filtered, were evaporated to the consistence of an extract. This, whilst hot, was submitted to pressure between folds of bibulous paper, then treated with alcohol of 34°, filtered, and about one third of the menstruum distilled off. By a skilful evaporation of the remainder, the salicine was in very pure pearly white crystals, like those presented by M. Becquerel to the Academy. M. Peschier asserts that the addition of sub-carbonate of potassa to the decoction of the bark and the current of sulphuretted hydrogen, as proposed by M. Roux, should be discarded; for the potassa appears to offer no other advantage than to render the decoction less viscid, whilst its employment occasions the use of a much larger quantity of subacetate of lead. The carbonate of lime by itself both decomposes the superabundant salt of lead and saturates the acetic acid.

Julia Fontenelle, who appears to have drawn up the above account of the preparation of salicine, adds that himself, and likewise M. Quesneville, the son, had found traces of sulphate of lime in the salicine presented by M. Becquerel.—*Journal Chimie Med. September* 1830. F. R. S.

Ioduretted Hydriodic Acid an agent to distinguish Rhubarb.—According to M. Geiger, the ioduretted hydriodic acid gives, with the several varieties of rhubarb, different colours, which enable us to distinguish them, viz.

1 Russian rhubarb,	green,
2 Chinese,	brownish,
3 English or pseudo-Russian,	deep red,
4 French,	blue.

The same author thinks that by iodine we can determine whether rhubarb will keep a long time or not.

This conservation depends on the greater or less quantity of amylaceous fecula which it contains; it keeps worst when the fecula is in large proportion.—*Jour. Chim. Med. Sept.* 1830.

Analysis of the Leaves of Uva Ursi.—M. Meissner has obtained from 1000 grains of these leaves,

1.	Gallic acid,	10 grains,
2.	Tannin, with a little gallic acid,	29 "
3.	Tannin,	335 "
4.	Resin,	44 "
5.	Chlorophyllin,	$63\frac{1}{2}$ "
6.	Extractive with acid malate of lime, traces of hydrochlorate of soda, &c.	$33\frac{5}{8}$ "
7.	Extractive and citrate of lime,	$8\frac{1}{8}$ "
8.	Gum, obtained by potassa,	157 "
9.	Extractive, obtained by potassa,	176 "
10.	Woody fibre,	96 "
	Water,	60

Jour. Chim. Med. Sept. 1830.

Examination of the Milky Juice of the Fig.—According to M. Geiger, the juice of the fig tree is composed, 1. of elastic gum differing from caoutchouc, 0,03 or 0,04; 2. of a resin insoluble in ether; 3. of gum, 0.02; 4. of albumen; 5. of extractive; 6. of small quantities of sulphates, hydrochlorates, and other salts formed by the vegetable acids; 7. of an odorous substance; 8. of water.—*Ibid.*

Analysis of the Cocoa Nut.—The liquid contained in the nut, analysed by M. Buchner, consisted of water, albumen, sugar, free phosphate of lime, and a volatile principle. The white substance lining the interior of the nut, according to the same author, contains, in the 100 parts,

Water,	31.8
Stearine and elaine,	47.0
Albumen containing phosphate of lime and sulphur,	4.33
	3.0
Gum and salts,	1.1
Insoluble ligneous fibre,	8.6

Ibid.

Analysis of Balsam of Mecca, by M. Tromsdorff.—500 parts of pure balsam furnished

1.	Volatile oil,	150
2.	Neutral resin, insoluble in alcohol,	20
3.	do. soluble in do.	320
4.	Colouring extractive matter, bitter,	2
5.	Loss,	8

This analysis confirms our previous accounts, that the fluid resin of the Mecca balsam tree contains no benzoic acid; consequently, it should not rank with the balsams.—*Ibid.*

Analysis of Copaiba.—M. Gerber, of Hamburgh, has analysed the pale yellow copaiba, and obtained the following results:—Volatile oil, 41; a brown resin, insoluble in cold petroleum, 2.18; a brittle yellow resin, soluble in cold petroleum, 51.38; water, 5.44.

When the copaiba becomes old, it undergoes some changes, according to M. G.; a part of the volatile oil appears to be transformed into a brown resin. Thus the analysis of old copaiba furnished the following results:—Volatile oil, 31.7; soft brown resin, 11.15; brittle yellow resin, 53.68; water and loss, 4.10.

Purity of Balsam Copaiba.—The best test of this, according to M. Gerber, is the caustic ammonia, which furnishes at once a clear solution, whilst the solution with potash does not become clear until after some time. The addition of a very small quantity of fatty oil renders the ammoniacal immediately cloudy and thicker.—*Lond. Med. and Surg. Jour. from Apotheken Archives des tom. XXX.*

Centaurine.—At a sitting of the Society of Pharmacy of Paris, 14th of July 1830, M. Dulong of Astrafort, pharmacien, announced the presence of a new product from the centaury, possessing powerful febrifuge properties, and which he designates hydrochlorate of centaurine. MM. Thenard and Magendie were appointed to examine it.—*Journal de Pharmacie, Aug.* 1830.

Powdering Phosphorus.—M. Casaseca remarks that the method of pulverizing phosphorus mentioned by all chemical authors, is that of agitation for some time in water, in a well corked bottle; but he observes, the powder obtained by this method is very imperfect; whereas if alcohol of 36° be used instead of water, a powder of the utmost fineness is produced, which has a crystalline appearance, and on agitating the liquid in the sun, the bottle appears to be entirely filled with a light brilliant powder.—*Philosoph. Mag. from Journ. de Pharmacie, April,* 1830.

Analysis of Mustard Seed.—Baume, and after him MM. Deyeux and Thiberge, have stated the existence of *sulphur* in the essential oil of mustard. MM. Henry, Jun. and Garot found among other principles a peculiar acid, which they called *sulpho-sinapic acid.*

After showing that the substance on which these chemists operated could not be pure, on account of some atomic discordances in the compounds it is stated to have formed with various bases, M. Pelouze maintains that the acid is merely the *hydrosulphocyanic*, existing in the state of sulphocyanuret of calcium; it appears, however, that the sulphur which the seed contains does not exist entirely in this state, but also uncombined; for when the seed is boiled with potash, acetate of lead shows the presence of sulphuret of potassium.

Hydro-sulphocyanic (or rather sulphocyanic acid) may be obtained from the seed by the direct action of dilute sulphuric acid upon strong decoctions of it, but the quantity is small. The following is given by M. Pelouze as the composition of mustard seed :—volatile oil, fixed oil, yellow colouring matter, albumen, (crystallizable white colouring matter, discovered by MM. Henry and Garot) bimalate of lime, citrate of lime, sulphocyanuret of calcium, and uncombined sulphur.—*Philos. Mag. from Ann. de Chim. June* 1830.

Odoriferous Troches for Fumigation.

Take of Benzoin in tears,	½ oz.
Storax calamita,	4 sc.
Dry balsam of Peru or Tolu	2 dr.
Cascarilla,	4 sc.
Cloves,	½ dr.
Powdered charcoal,	1½ oz.
Nitrate of potassa,	1 dr.
Volatile oil of orange flowers,	
Tincture of ambergris,	aa ½ dr.
Mucilage of gum tragacanth,	q. s.

Form the whole into a paste and shape it into little cones or triangular nails, about an inch high. Preserve them dry. By applying fire to the extremity they burn without flame, spread an agreeable perfume, and may be used to fumigate the chambers of the sick.—*Virey's Pharmacy.*

Electuaries, Confections, &c.—Ligneous vegetable powders (those of woods, roots, leaves, and flowers) absorb three parts of syrup or honey in order to form an electuary ; and although they appear at first too liquid, yet they soon swell and absorb all the redundant moisture. The dry gum-resins require their weight of syrup, and the pure resins less than their weight; mineral substances (not soluble, as the salts) take half of their weight, and the neutral salts rather less. It may be remarked, that the pulps, extracts, and deliquescent salts, which enter into electuaries and confections, ought to diminish the proportions of syrups, honey, or other liquid that may be employed.

Quantities of Syrup absorbed in Electuaries by different substances, according to Baume.

1	part of vegetable powders	absorbs	3	parts of syrup.
1	" gum resins		1	"
1	" resins		0.75	"
1	" mineral substances, such as antimony and calomel,		0.50	"
1	" neutral salts		0.33	"
1	" deliquescent and alkaline salts		0.10	"
1	extracts, pulps, electuaries, &c.		0	

In the acidulated tartrate of potash and iron, made by mixing equal parts of cream of tartar and iron filings, it is proper at first, in consequence of the mutual reaction of the two substances, to add but one part of syrup, on the next day to add a second part, and three days afterwards the addition of a third part may be made, in order to form an electuary.—*Ibid.*

Almond Paste for the Hands.

Take of Almonds, sweet,	4 oz.
do. bitter,	4 oz.
Lemon juice,	2 oz.
Water,	1 oz.
Oil of sweet almonds,	3 oz.
Brandy of 19 or 20 degrees, (B.)	6 oz.

The mass remaining after the emulsion of almonds has been made, may be employed for this purpose, though the perfect kernels are the best. To the almonds broken, are to be added gradually the lemon juice and oil, and afterwards the spirit to prevent fermentation, and the appearance of insects, which are very fond of this compound. It must be preserved in a covered vessel, and a small piece employed to wash the hands or face. It is said to render the skin very white and supple.—*Virey's Pharmacy.*

Dentifrice of Coral and Quinia.—J. Pelletier directs the following proportions:

Take of Red coral in fine powder,	1 oz.
Carmine lake,	8 grs.
Sulphate of quinia,	4 grs.
Volatile oil of mint,	2 drops.

Make the mixture according to art.—*Ibid.*

Resino-saponaceous Mixtures.—Dr Plenck of Vienna devised the formulæ for these mixtures. Water does not precipitate the resinous molecules when added to a compound of resin and soap dissolved in alcohol:

Soap of the Resin of Guaiacum.

Take of Resin of guaiacum,	½ oz.
White soap of the sweet oil of almonds,	1 oz.
Rectified alcohol, (of 32° B.) q. s. or	8 oz.

Pulverise the resin and rasp the soap. Put them with the alcohol into a closed vessel, and digest.—Filter, and preserve the liquid tincture, or evaporate to dryness. One gramme (about 16 grs. troy) of this dry soap, or four times the quantity of the liquid, may be given for a dose in atonic gout or rheumatism, in any proper vehicle.

Soap of the Resin of Jalap.—This is prepared in precisely the same manner and proportions; but the dose of the tincture may be from 1 dr. to 1½ dr., in any mucilaginous drink—or in the dry state 10 or 20 grs. It purges freely and without pain, and has no disagreeable taste.

The above preparations are certainly elegant, and it is very probable would answer a useful purpose as remedies.

Observations on the Vegetable Milk furnished by the Palo-de-vaca. By M. Cottereau.—The Spaniards, from the first period of their establishment on the coasts of South America, became acquainted with the vegetables which furnish this singular species of milk; but being little instructed in natural history, they confounded the milk proper for the nourishment of man with other lactescent juices, which, exposed to the air, promptly harden, and form the substance known under the name of caoutchouc. There are many trees on this continent and in the Antilles which furnish caoutchouc. Dr Rouillin, one of the most distinguished naturalists of the age, who visited this part of the globe, was acquainted with four species of *hevea*, and five or six trees or shrubs belonging to other families, which afford a gum elastic more or less perfect. Those vegetables which yield a potable milk are not so numerous, nor so widely diffused. For a long time the single species described by Humboldt was all that was known—the *galactodendron*. M. W. Arnatt made known a second, which is a *taberuæncontana*. It appears that there is also a third, for according to Dr Rouillin, who furnishes these interesting details, there is in the province of Choco, a milk-producing tree, which certainly is not the *palo-de-vaca*, and which, by his statement, does not appear to belong to the family of Apocinees.

So far as is known at present, the geographical distribution of the palo-de-vaca is limited to the north side of those mountains which branch off from the eastern chain of the Andes, near the Lake of Maricaibo.

It is a large tree, with hard and coriaceous leaves, and being often found growing in a stony soil, its roots creep on the surface which it cannot penetrate.

It would almost appear as if it could not derive from the ground sufficient nourishment for its support; nevertheless, if at the proper season its bark be wounded, there will issue an abundance of milk, of a beautiful colour, a balsamic odour, and agreeable taste, and without other inconvenience than being a little clammy. The people of the country often drink a cup of the milk under the tree in the morning, and sometimes make a more complete breakfast by crumbling into it some pieces of cassava, or other article.

If the milk of the palo-de-vaca be exposed to the air, it soon becomes covered with a membrane of considerable thickness, yellowish, stringy, very much like caseum, and almost as elastic as caoutchouc. This coagulum, to which the natives give the name of cheese, sours in a few days, and exhales an odour which closely resembles, in some respects, spoiled cheese. M. de Humboldt, who had not the means of making an exact analysis during his journey, judged that the characters which we shall enumerate, indicated with sufficient clearness, the presence of caseum and caoutchouc. His opinion was common to most other chemists at the time, that the chief difference between vegetable and animal milks was, that in the former caoutchouc occupied the place of butter in the latter. There exists a close analogy between these two fluids, but it is in different points from those suspected by Humboldt.

In 1823 two able chemists, MM. Boussingault and Rivero, visited the same localities where Humboldt had made his observations, and possessing the advantage of a more complete apparatus, made a very satisfactory analysis, of which the following is an extract:

The milk of animals it is well known readily coagulates by the addition of an acid; but in that of the palo-de-vaca the admixture of a large proportion produces no coagulation; so far from it that the addition of a few drops of acid will retard for a long time the decomposition of this lactescent juice, although exposed to the open air.

No precipitate is occasioned by the addition of ammonia, a fact which indicates the total absence of caoutchouc. If this vegetable milk be placed over the fire, it behaves itself in a manner very much resembling that of the cow; *i. e.* a pellicle soon forms on its surface, which prevents evaporation, and occasions the fluid to foam over the sides of the vessel.

When the fluid parts are slowly dissipated, we procure a sort of cream cake, and if the heat be continued small drops of an oily appearance collect on the surface of this extract, and as the number augments, the coagulum finally floats in the midst of them, which hardens progressively and diminishes in volume. At this moment an odour is perceived strongly resembling cutlets when taken from the fire. The oily liquid, when cold, assumes the form of a white translucid mass, altogether similar in appearance to blanched bees-wax, and possessing absolutely the same chemical properties. Dr Rouillin states, that MM. Boussingault and Rivero made candles of it, which burned exceedingly well.

The liberated coagulum which swims in the fluid wax is not soluble in alcohol, and this property enables the operator to separate from it the wax which adheres to it. By washing it several times in boiling alcohol, and decanting it promptly, there remains finally a white fibrous mass, soluble in dilute muriatic acid, which manifests the same properties as fibrine extracted from animal matters.

If a small quantity of alcohol be poured on the milk of the *palo-de-vaca*, it occasions disturbance, and it may then be filtered. The liquor thus obtained contains much water, a little sugar, a salt of magnesia, which is not an acetate, and a colouring principle. This vegetable milk contains neither albumen, caoutchouc nor caseum. This latter principle is supplied by the fibrine, whilst the wax, in its composition, performs the same rôle as the butter does in the milk of animals.—*Jour. de Chimie Medicale, July* 1830. B. E.

Drusium, Resin of Oak.—Mr Lemaire de Liancourt has discovered a new substance in the bark of several species of oak—in those, especially, known by the specific name of *quercus robur* and *Q. pedunculata.* He has called this new substance *drusium*, or *oak resin.* It is found in the form of vermiculated lines of the size of a sewing thread, or in small masses of the bulk of millet seed. It is transparent when recent, and of a bright yellowish red colour, losing gradually both these physical properties by exposure to the dampness of the air, and becoming brown and opaque. The atmospherical moisture renders it soft, dilates its tissue, and converts it into a fine mouldiness of a white colour, which indicates the presence of vegetable mucus and gum.

Mr Lemaire has found this substance to contain a resin and an alkaline matter, and considers it as a gummo-resinous substance, analogous to ulmine, by its propensity to become hydrated. It seems to be produced by a natural combination of the *succi proprii* of the oak. It exudes, especially, from trees from ten to twenty years old, has no sensible smell, and does not seem to contain the balsamic benzoical matter which is emitted from ignited oak. Mr L. thinks this semi-tonic substance might become an useful therapeutical agent.—*Achives Génerales de Medecine.*

INDEX TO VOLUME II.

Acetic ether, constitution of, ... 82
Acid, acetic, its purity, ... 155
  benzoic, do. 155
  citric, do. 156
  citric from gooseberries 81
  hydrochloric, its purity, ... 156
  hydrocyanic, do. 156
    its density with various proportions of water, . . 157
  kinic, ... 229
  kinic, and principal combinations with salifiable bases, . . 227
  nitric, its strength, ... 157
  oxalic, lozenges of, ... 251
  pinic, a constituent of Venice turpentine, ... 81
  silvic, from the fir tree, ... 82
  sulphuric and alcohol, mutual action of, ... 73
Address by the vice-president, ... 258
Adulteration of drugs, ... 155
    acid, acetic, ... 155
      benzoic, ... 155
      citric, ... 156
      hydrochloric, ... 156
      hydrocyanic, ... 156
      nitric, ... 157
      sulphuric, ... 157
    ammonia 157
    Angustura bark, ... 157
    antimony, ... 242
    bark of pomegranate root, ... 246
    borax 243
    canellá alba and winter's bark, ... 246
    carbonate of lead, ... 243
    castor, ... 244
    catechu, ... 243
    chlorate of potassa, ... 244
    chromate of lead, ... 244
      of potassa, ... 245
    copaiva, ... 245
    guaiacum wood, ... 247
    gum arabic, ... 247
      senegal, ... 247
      tragacanth, ... 247
    sulphuric ether, ... 246
    wax, ... 245
Alba canella and winter bark, ... 246
Allinson, Samuel, jun., on seneka oil, ... 35
Alkaloids, vegetable, chlorates and iodates of, by M. Serullas, . . 301
Almond paste for the hands, ... 342
Amadine, note upon, by M. Guibourt, ... 49

Ammonia, its purity, 157
Analysis of balsam of Mecca, 339
  cocoa nut, 339
  copaiba, 340
  milky juice of the fig, 339
  mustard seed, 340
  uva ursi leaves, 339
  iodate and chlorate of cinchonia, 307
Angularis sabbatia, 213
Angustura bark, test of, 157
  effects of reagents on true and false, 158
  tree, or orayuri, by Dr Hancock, 50
Animal charcoal in glandular affections, 162
  pastilles of, 162
Antidotes to the vegetable alkalies, 83
Antimony, adulterations of, 242
Aqueous solution of the extract of sarsaparilla, 65
Arabic, gum, sophistication of, 247
Aromatic syrup of rhubarb, by E. Durand, 218
Artificial ultramarine, 136

Balsam of copaiva, analysis of, 340
  purity of, 340
  of Mecca, analysis of, 339
Bark, Angustura, 157, 158
  of pomegranate roots, 246
  winter, 246
Baume's hydrometer, 286
Benzoic acid, 155
Beral, M., on plaster cloths, 166
  on some formulæ for preparations of sarsaparilla, 64
Blistering plaster, 166
  with cantharides, 166
  without 167
Blondeau, A., on the extraction of morphia, by fermentation, 219
Blue colouring matter of lapis lazuli, 136
Bogota, styrax of, by M. Bonastre, 163
Borax, manufacture of, 243
Brande, T. W., on the mutual action of sulphuric acid and alcohol in the formation of ether, 73
Bromine, chlorine and iodine, antidotes to vegetable alkalies, 73
  and its combinations, by Charles Lowig, translated by E. Durand, 89, 169
Bromine and aluminum, 177
  antimony, 179
  arsenic, 178
  barium, 174
  bismuth, 179
  borax, 101
  calcium, 175
  carbon, 98
  chlorine, 103
  chrome, 177
  copper, 182
  cyanogen, 169
  gold, 185
  hydrogen, 97
  iodine, 103
  iron, 181
  lead, 181
  magnesium, 176
  manganese, 178
  mercury, 183

Bromine and metals, 170
  nitrogen, 104
  organic bodies, 186
  oxygen, 96
  phosphorus, 101
  platinum, 186
  potassium, 172
  selenium, 102
  silver, 184
  sodium, 174
  sulphur, 101
  tin, 180
  water, 95
  zinc, 80
Buena, 240

Canella alba and winter bark, 246
Cantharis, some indigenous species of, by E. Durand, 271
Cantharides, growth and development of, 255
Carbonate of lead, purity of, 243
Castor, adulteration of, 244
Catechu sophisticated, 243
Centaurine, active principle of centaury, 340
Charcoal, animal, in glandular affections, 162
  pastilles of, 162
Chinioidine, non-existence of, 161
Chiococca racemosa, active principle of, 84
Chlorates and iodates of the vegetable alkaloids, 301
Chlorate of brucia, 305
  cinchonia, 305
  morphia, 304
  potassa, adulteration of, 244
  quinia, 305
  strychnia, 305
  veratria, 305
Chlorine, iodine and bromine antidotes to vegetable alkaloids, 73
Chromate of lead adulterated, 244
  potassa, combinations, 245
Cinchona containing iron, 216
  kinate of, 232
  confounded with other genera and species, notice of, by De Candolle, 234, 290
  condaminea, 237
  danais, 294
  exostemma, 291
  hymenodyction, 293
  lancifolia, 237
  luculia, 294
  macrocalyx, 239
  macrocarpa, 239
  magnifolia, 239
  pinckneya, 293
  pubescens, 238
  remijia, 290
  scrobicalata, 237
Cinchonia, analysis of iodate and chlorate of, 107
Citric acid, 81, 156
Clemson on piperine, 249
Cocoa nut, analysis of, 339
College, minutes of, 159, 311
Communications, original, 9, 89, 169, 257
Confections, electuaries, &c. 341

- Copaiva, 84
    - analysis of, 340
    - purity of, 340
    - adulterated, 245
    - and magnesia, 162
- Coral and quinia dentifrice, 342
- Cough lozenges of Tronchin, 250
- Coxe's hive syrup, 110
- Cuisinier, sudorific syrup of, 67

- Decandolle's notice of genera and species whose barks have been confounded with cinchona, 234, 290
- Decoctum diureticum, 109
    - pectorale corroborans, 109
    - senega, 108
    - sabbatia angularis, 215
- Dœbereiner's glass of strontia, 252
    - soluble glass of, 252
- Dover's powder, 250
- Drusium, or resin of oak, 344
- Drying narcotic plants, mode of, 253
- Durand, Elias, on bromine, 89, 169
    - moxas, &c. 206
    - spiced syrup of rhubarb, 218
    - some indigenous species of the genus cantharis of Latreille, 271

- Ellis, Benjamin, M.D. on weights and measures, 111, 188
    - Charles, on hemlock resin, 18
        - on the presence of iron in powdered cinchona, 216
- Ether, acetic, chemical constitution of, 82
    - formation of, and nature of the process, by W. T. Brande, 73
    - sulphuric, preparation of, 246
- Ergot of maize, 85
- Excoriations, plaster for, 167
- Extracts, narcotic, mode of preparing, 86
- Extract of sabbatia angularis, 215
    - sarsaparilla, diluted with alcohol, 65
    - senega polygala, 108

- Falsifications des drogues, simple et composees 155
- Faure J. B. on a new process for procuring morphia, 71
- Fecula from arrow root, by M. Guibourt, 47
    - wheat, 46
- Fig, analysis of the milky juice of 339
- Fumigation, odoriferous troches for, 341

- Glass of Strontia and soluble glass of Dœberiner, 252
- Green, Schweinfurt, preparation of, 308
- Griscom, J. H. translation of Decandolle's paper on cinchona, &c. 234, 290
- Gum arabic, sophisticated, 247
    - senegal, 247
    - tragacanth, 247
- Guaiacum wood, 247
- Guibourt, M. on fecula, 46

- Hancock John, M.D. on sarsaparilla and its preparations, 37
    - on the Angustura bark tree, 50
    - on the kusia or koosia of the Indians, 144
- Hemlock resin, by C. Ellis, 18

Hive syrup of Coxe, 110
Hodgson William, Jun. on the compound syrup and fluid ext. of sarsaparilla, 282
Hydrocloric acid, 156
Hydrocyanic acid, 156
Hydrometer of Baume, 286
    common, remarks on, with a description of a new method of graduating it, by D. B. Smith, 9

Indigenous species of the genus cantharis, 271
Infusion of sabbatia angularis, 215
Insects, vesicating, 165
Iodates and chlorates of the vegetable alkaloids, translated by F. R. Smith, 301
Iodates of brucia, 302
    cinchonia, 301
    quinia, 301
    strychnia, 301
    veratria, 302
Iodine, chlorine, and bromine, antidotes to the vegetable alkaloids, 73
Ioduretted hydriodic acid, test for rhubarb, 338
Ipomea jalapa, by D. B. Smith, 22
Iron in powdered cinchona, 216
    some preparations of, by A. Ure, M.D. 61

Jalapa ipomea, 22
Jalap resin, soap of, 342
    analysis of, 73
Jujube paste, 251

Kermes mineral, 164
Kinic acid, 229
    and combinations with salifiable bases, 227
Kinates, 230
Kinate of cinchonia, 232
    quinia, 231
Kusia or koosia of the Indians—bitter cucumber—momordica operculata of Lin. by Dr Hancock, 144

Lapis lazuli, blue colouring matter of, 136
Lead, carbonate of—purity of, 243
Light, effect of on plants, 255
Liquorice paste, 251
Lowig, Charles, on bromine and its principal combinations, 89,169
Lozenges, cough, 250
    of magnesia, 251
    oxalic acid, 251

Magnesia lozenges, 251
    metal of, 163
    and turpentine, 168
Magnesium, preparation of, 164
    properties of 164
Maize, ergot of, 85
Metal, radical of magnesia, 163
Milk of the palo-de-vaca, 343
Mineral kermes 164
Minutes of the College, 159, 311
Miscellany, 81, 160, 248, 337
Mixtures resino saponaceous, 342
Morphia, process for, by J. B. Faure, 71
    extracted by fermentation, 219
Moussache and tapioca, 47
Moxas and preparation of, by E. Durand, 206

Mustard seed, analysis of, 340
Myrrh, test of, 84

Narcotic extracts, mode of preparing, 86
  plants, mode of drying, 253
Nitric acid, test of, 157
Non-existence of chinioidine, 161
Nutgalls, antidote to strychnia, 83

Opium, fermentation of, applied to extraction of morphia, by A. Blondeau, 219
Orayuri, or Angustura bark tree, 50
Organic base, salifiable, new, 69
Original communications, 9, 89, 169, 257
Oxalic acid lozenges, 251

Palo-de-vaca, milk of, 343
Paste of jujube, 251
  liquorice, 251
Peruvian bark, estimation of the vegeto-alkali of, 254
Pharmacie, la Societe de, 253
Pharmacy, state of in the department of the Seine, 296
Phosphate of quinia, 254
Phosphorus, powdering, 340
Pinic acid, a component of Venice turpentine, 81
Piperine, notice of, by T. G. Clemson, 249
Plants, effects of light on, 255
Plaster cloth, formula for, by M. Beral, 166
  blistering with cantharides, 166
    without, 167
  issue, 166
  for excoriations, 167
  cloth, silk, 250
Polygala senega, by D. B. Smith, 105
Pomegranate, bark of the roots, 246
Potash, chlorate of adulterated, 244
  chromate of, combinations, 245
Powder, Dover's, 250

Quinia, kinate of, 231
  and coral dentifrice, 342
  phosphate of, 254
  sulphate, taste of, 254

Radical metal of magnesia, 163
Resino-saponaceous mixtures, 342
Resin of guaiac, soap of, 342
  jalap, do. 342
  oak or drusium, 344
Review of the Pharmacopœia of the United States, New York edition, 316
  de Traite des Moyens de Reconnaitre les Falsifications des Drogues, Simples et Composees, &c. By MM. Bussey and Boutron-Charlard, 154, 242
Rhubarb, aromatic syrup of, 218
  test for, 338
Root of pomegranate, the bark of, 246

Sago, 48
Sabbatia Angularis, by D. B. Smith, 213
  decoction of, 215
  extract of, 215
  infusion of, 215
  tincture of, 215

Salacine active principle of willow bark, 248
    composition of, 337
    preparation of, 337
Salifiable organic base, new, 69
Sarsaparilla, 248
    and its preparations, by Dr Hancock, 37
    compound syrup and fluid extract of, by W. Hodgson, jun. 282
    formulæ for different preparations of, by M. Beral, 64
    aqueous solution of extract of, 65
    extract diluted with alcohol, 65
    syrup of extract of, 66
    vinous solution of extract of, 66
Scheele's green, 252
Schweinfurt green, preparation of, by Creuzberg, 308
Selected articles, 39, 136, 219, 290
Seneka oil, by S. Allinson, jun. 35
Senega polygala, 105
    preparation of, 108, 109
Senegal gum sophisticated, 247
Silk plaster cloth, 250
Silvic acid from pinus sylvestris, 82
Smith, Daniel B., on Baume's hydrometer, 286
    common hydrometer, 9
    ipomea jalapa, 22
    polygala senega, 105
    sabbatia angularis, 213
  F. R., translation of a memoir on the iodates and chlorates of vegetable alkaloids, 301
  Dr's, sudorific mixture, 68
    wine, 68
Soap of resin of guaiacum, 342
    jalap, 342
Source of spirits, new, 253
Statistical table of the pharmaciens of the department of the Seine, 297
Soluble glass of Dœbereiner, 252
Strontia, 252
Strychnia, nut-galls antidote of, 83
Styrax or storax of Bogota, 163
Sulphate of quinia, taste of, 254
Sulphuric acid, 157
    and alcohol, mutual action of, 73
  ether, preparation of, 246
Syrup of Cuisinier, 67
    gum tragacanth, 168
    senega, 109

Table, statistical, of the pharmaciens of the Seine, 297
Tartrates of iron, 61
Taste of sulphate of quinia, 254
Tinct. sabbatia angularis, 215
    of senega, 108
Tragacanth gum powder sophisticated, 247
    syrup of, 168
Traite des moyens de reconnaitre les falsifications des drogues, simple et composees, &c. review of, 154, 242
Troches, odoriferous for fumigation, 341
Troth, Henry, address, 258
Turpentine and magnesia, 168

Ultramarine, artificial, 136
Ure, Andrew, M.D. on some preparations of iron, 61
Uva ursi, analysis of, 339

Vegetable alkali, estimation of in Peruvian bark, ... 254
Venice turpentine contains pinic acid, ... 81
Vinous solution of extract of sarsaparilla, ... 66
  extract of sarsaparilla, ... 67
Vesicating insects, ... 165

Wax, sophistication of, ... 245
Weights and measures, by B. Ellis, M.D. . . . 111, 188
Willow bark, active principle of, ... 85, 249
Winter bark and canella alba. 246
Wood of guaiacum, sophistication of, ... 247

END OF VOL. II.

Acme
Bookbinding Co., Inc.
100 Cambridge St.
Charlestown, MA 02129

JUN 18 1982